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MINE FEASIBILITY STUDY
GILT EDGE EXPANSION PROJECT
BROHM MINING CORPORATION

Prepared for

ROBERTS & SCHAEFER Company

INDEPENDENT
MINING CONSULTANTS, INC.
TUCSON, ARIZONA

FEBRUARY 1991

GILT EDGE EXPANSION MINE PLAN

FEBRUARY 1991

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INDEPENDENT
MINING CONSULTANTS, INC.

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1.0 INTRODUCTION

1.0 INTRODUCTION

1.1 Scope of Work

Brohm Mining Corporation's Gilt Edge mine, located near Lead, South Dakota, currently mines and heap leaches approximately 4,000 tpd of oxide gold ore. Brohm proposes to implement a 12,500 tpd sulfide ore milling operation when currently proven and probable oxide ore is exhausted in about two years.

On behalf of Brohm Mining Corporation, Roberts & Schaefer Company has asked Independent Mining Consultants to perform an audit of Gilt Edge ore reserves, and to develop a mine plan to "bankable" levels for the proposed sulfide ore operation. The main tasks involved in performing this work were:

> **Perform Ore Reserve Audit:** Review geology and structure; drilling, sampling and assaying procedures; ore reserve block model construction and input; geostatistics; block grade calculation methods; comparison of projected and actual tonnages & grades.

> **Develop Mine Plan:** Run floating cones; design phased pits; develop annual ore production & waste dumping schedule; produce annual pit and waste dump plans; calculate haul profiles; calculate equipment and manpower requirements; calculate capital and operating costs.

Limited mine plan optimization studies were also performed, including studies of throughput rate, cutoff grade policy, mining phase viability and leach pad relocation.

1.2 Sources of Data

All data used to audit the ore reserves were supplied by or through Gilt Edge mine staff. These data included geologic and structural plans and sections, various reports and memoranda on drilling, assaying, density measurements, geostatistics etc., and a copy of the Gilt Edge ore reserve block model, which was loaded into IMC's computer facility in Tucson for evaluation and for use in designing the mine plan.

The main sources of data used to develop the mine plan were as follows:

Gilt Edge mine staff: Preliminary mining phase designs and schedules. Heap leaching costs & recoveries. Bulk densities. Waste categorization and dump design criteria.

Roberts & Schaefer: Sulfide ore process costs, recoveries and throughput rates. Tailings dam & road fill waste tonnage requirements. Oxide and sulfide crusher locations. Construction schedule.

IMC used these and other data to develop its own estimates of equipment and personnel requirements and capital and operating costs for the mining operation. Capital costs were based on vendor quotations.

1.3 Disclaimers

Securities and Exchange Commission Form S-18 defines an ore reserve as "that part of a mineral deposit which could be economically and legally extracted or produced at the time of the reserve determination." IMC believes that the current mineable reserves at Gilt Edge meet the SEC "economic" requirement in that they can be mined at a profit at $400/oz gold, which is the approximate current gold sales price. IMC also believes that these reserves will generally qualify as "proven" or "probable" ore within SEC definitions. However, the viability of both the ore reserves and the mine plan discussed in this report is contingent on the assumptions:

1. That Brohm can obtain the permits it needs to operate the mine promptly, and without permit conditions being modified to the point where operating efficiency or economic viability is compromised.

2. That Brohm holds enough land to implement and complete the proposed mining operation as planned (an exhaustive check of Brohm's land and royalty position was not included in IMC's scope of work).

3. That the price at which Brohm can sell gold does not decrease substantially between now and commencement of mining operations.

2.0 SUMMARY

2.0 SUMMARY

2.1 Description of Gilt Edge Operation

The Gilt Edge mine is located in the Black Hills southeast of Lead, South Dakota. Gold mineralization at Gilt Edge is developed in Tertiary trachytic rocks that intrude Precambrian foliated basement rocks and Cambrian sediments.

Gilt Edge is currently the site of a 4,000 tpd gold heap leach operation. Within about two years, however, heap leachable oxide ore will be largely exhausted. At this point, the proposal is to commence mining the deeper ore below the oxide cap. This ore is dominantly sulfide ore. Only comparatively small tonnages of oxide and "mixed" material are present.

The intention is to mine and process sulfide ore at a rate of 12,500 tpd (4,562,000 tpy). With mineable reserves in the 45 million ton range, this will give a 10-year mine life.

Sulfide ore will be processed by milling, flotation and cyanide leaching. Oxide ore will continue to be heap leached during the early years of operation. Mixed ore will be sent either to the mill or to the leach pad depending on sulfide content. After the leach pad shuts down, the small tonnage of low-sulfide mixed ore and oxide ore mined will be sent to the waste dumps.

2.2 Ore Reserve Model

Assay, geologic and bulk density data from 777 rotary and core holes, amounting to a total of 432,949ft of drilling, have been used by Brohm Mining to put together a block model consisting of over 1 million 50ft X 50ft X 20ft blocks for the Gilt Edge property. The drillhole spacings, drilling methods, sampling procedures and assaying techniques employed to obtain gold grade data were generally adequate, and the block model has been appropriately constructed.

The inverse distance squared (ID2) method was used by Brohm to calculate block grades for determination of mineral inventory. The geostatistical procedures used to determine search radii were generally acceptable. Conservative geologic and structural boundary constraints prevent "smearing" of gold grades across mineral boundaries. Grade predictions derived from the ID2 model correlate acceptably with actual mined grades calculated from blast hole assays.

The ID2 model designated "90-4J" is used as the basis for calculating the mineral inventory at Gilt Edge. The Gilt Edge mineral inventory as a function of ore type and cutoff is summarized in Table 2-1:

TABLE 2-1

GILT EDGE MINERAL INVENTORY

Cutoff	Sulfide		Mixed		Oxide		Total	
(oz/t)	Mtons	oz/t	Mtons	oz/t	Mtons	oz/t	Mtons	oz/t
.000	533.8	.012	28.1	.013	49.5	.014	611.4	.012
.010	215.2	.024	12.1	.025	23.2	.025	250.5	.024
.020	102.2	.036	6.0	.037	11.6	.037	119.8	.036
.030	52.4	.048	3.1	.049	5.8	.050	61.3	.048
.040	27.4	.060	1.7	.061	3.2	.062	32.3	.060

2.3 Mineable Reserves

Mineable reserves were determined by running floating cones on the 90-4J block model to determine the economic limits of the ultimate sulfide pit, and by adjusting the limits of this pit to optimize economic benefits and to allow for adequate working space and haul road access.

The Gilt Edge ultimate pit, which was designed at a $400 gold price, contains the following mineable reserves:

Mill ore	43,011,000 tons at 0.040 oz/ton
Leach ore	2,135,000 tons at 0.039 oz/ton
TOTAL	45,146,000 tons at 0.040 oz/ton

Mill ore includes all of the sulfide ore to be mined, plus half of the mixed ore to be mined. It also includes 725,000 tons of sulfide ore at a grade of 0.048 oz/ton which will be mined and stockpiled during the oxide mining operation. Leach ore includes all oxide ore mined through the end of Year 2, plus half of the mixed ore mined over this period. All of the oxide ore and half of the mixed ore mined after Year 2 (a total of approximately 650,000 tons) is counted as waste. A total of 138 million tons of waste will be mined through the mine life, giving an overall stripping ratio of 3:1.

Cutoff grades were determined for different ore types based on projected operating costs and a $400 gold price. However, because of the minor variations in cutoff grade and the small tonnages of oxide and mixed material involved, a constant cutoff grade of 0.022 oz/ton was used to determine mineable reserves between Year 1 and Year 10, and a 0.025 oz/ton cutoff was used during preproduction.

2.4 Production Schedules:

Annual ore and waste production schedules for the Gilt Edge sulfide pit were developed from phased pit designs. The tonnages of mill and leach ore treated and the tonnage of waste mined are summarized by year on Table 2-2:

TABLE 2-2

ORE TREATMENT AND WASTE MINING SCHEDULE

Year	Mill Ore Treated		Leach Ore Treated		Waste Mined
	Ktons	Oz/ton	Ktons	Oz/ton	Ktons
Prep			457	.044	9,350
1	4,562	.040	816	.039	13,500
2	4,562	.041	862	.036	17,353
3	4,562	.045			18,137
4	4,562	.042			18,138
5	4,562	.039			18,141
6	4,562	.039			18,147
7	4,562	.036			11,236
8	4,562	.037			5,993
9	4,562	.042			5,609
10	1,953	.040			2,395
TOTALS	43,011	.040	2,135	.039	137,999

The 138 million tons of mine waste is segregated into "oxide" and "sulfide" categories. Oxide waste does not have the potential to generate acid leachate, and can be crest-dumped. Sulfide waste does have the potential to generate acid leachate, and must be dumped in 50ft lifts in order to segregate the waste material and minimize the likelihood of acidification. Oxide waste will be used to construct tailings embankments and roads, and for infill dumping in areas where dumping in 50ft lifts is not feasible. Sulfide waste will be dumped directly in proposed dump areas east of the mine and plant site in Butcher and Ruby Gulches.

Mill ore and leach ore will be taken either directly to the crushers, or to 75,000-ton ROM stockpiles located adjacent to the the mill crusher or the leach pad. (The ore tonnages shown in Table 2-2 reflect the tonnages of ore milled and leached, and not the tonnages mined. Treated and mined ore tonnages differ in some years because of stockpile movements.)

The stages in the development of the Gilt Edge sulfide pit and the waste dumps are summarized in Figures 2-1 through 2-8.

2.5 Mine Equipment Fleet:

Mining will be conducted using a combination of 7.25" blast hole drills, 13.5 yd hydraulic shovels and front end loaders, and 85 short ton trucks. The composition of the major mine equipment fleet through the mine life is summarized on Table 2-3:

TABLE 2-3

MINE EQUIPMENT FLEET

Number of Units

	7.25" Drill	13.5yd Shovel	85st Truck	13yd Loader	Track Dozer	Tire Dozer	Water Truck	Motor Grader
Prep	2	2	7	1	4	3	1	1
Yr 1	3	3	11	1	4	3	2	2
Yr 2	3	3	17	1	4	3	2	2
Yr 3	3	3	17	1	4	3	2	2
Yr 4	3	3	17	1	4	3	2	2
Yr 5	3	3	17	1	4	3	2	2
Yr 6	3	3	17	1	4	3	2	2
Yr 7	3	3	17	1	4	3	2	2
Yr 8	3	3	17	1	4	3	2	2
Yr 9	3	3	17	1	4	3	2	2
Yr 10	3	3	17	1	4	3	2	2

A more complete listing of equipment requirements is given in Section 2.7, which summarizes capital and operating costs.

2.6 Mine Personnel Requirements:

A total of 21 salaried and 58 hourly paid staff will be required during the 1.75-year preproduction period. During the mine life, salaried staff will increase to 25. The number of hourly paid personnel will peak at 167 in Year 2, and decrease to 106 by the end of the mine life.

Tables 2-4 and 2-5 summarize salaried staff and hourly paid personnel requirements by year for the Gilt Edge operation.

2.7 Mine Capital & Operating Costs:

Unless otherwise specified, all of the costs provided in this report are given in constant US dollars referred to the fourth quarter of 1990.

Total capital costs for mine equipment and facilities are estimated at $27.0 million through the mine life (excluding the costs of the mine shop, warehouse and changehouse, which have been costed separately by Roberts & Schaefer) and are summarized in Table 2-6. These costs include replacement capital, but do not include stripping and other mine operating costs incurred during the preproduction period.

Mine operating costs are summarized on Table 2-7. The average cost of mining a ton of material through the mine life (including preproduction) is estimated at $0.835/ton. At the maximum mining rate of 22.7 million tons per year (which is achieved between Year 2 and Year 6) the average mining cost is $0.762/ton.

Table 2-4

Brohm Gilt Edge Project

Salaried Staff Requirements

Job Title	Prep	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Mine Superintendent	1	1	1	1	1	1	1	1	1	1	1
Mine General Foreman	1	1	1	1	1	1	1	1	1	1	1
Mine Clerk	1	1	1	1	1	1	1	1	1	1	1
Mine Shift Foreman	2	4	4	4	4	4	4	4	4	4	4
Drill-Blast Foreman	1	1	1	1	1	1	1	1	1	1	1
Maintenance Foreman	1	1	1	1	1	1	1	1	1	1	1
Maintenance Clerk	1	1	1	1	1	1	1	1	1	1	1
Maint Shift Foreman	2	4	4	4	4	4	4	4	4	4	4
Chief Mine Engineer	1	1	1	1	1	1	1	1	1	1	1
Senior Mine Engineer	1	1	1	1	1	1	1	1	1	1	1
Junior Mine Engineer	1	1	1	1	1	1	1	1	1	1	1
Engineer Clerk	1	1	1	1	1	1	1	1	1	1	1
Senior Geologist	1	1	1	1	1	1	1	1	1	1	1
Mine Geologist	1	1	1	1	1	1	1	1	1	1	1
Surveyor	1	1	1	1	1	1	1	1	1	1	1
Surveyor Helper	1	1	1	1	1	1	1	1	1	1	1
Ore Control	1	1	1	1	1	1	1	1	1	1	1
Draftsman	1	1	1	1	1	1	1	1	1	1	1
Computer System Opr	1	1	1	1	1	1	1	1	1	1	1
	---	---	---	---	---	---	---	---	---	---	---
Total Staff	21	25	25	25	25	25	25	25	25	25	25

Table 2-5

Brohm Gilt Edge Project
Hourly Labor Requirements

Job	Prep	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Mine Operations:											
Driller	3	8	9	9	9	10	9	6	4	4	3
Air Track Operator	1	2	2	1	1	1	1	1	1	1	1
Shovel Operator	3	8	9	9	9	9	9	7	4	4	4
Loader Operator	1	2	2	2	2	2	2	2	2	2	1
Truck Driver	11	34	53	52	52	47	54	40	31	35	32
Dozer (370 nhp) Opr	3	5	6	5	5	5	5	5	5	5	5
Dozer (285 nhp) Opr	2	3	3	3	3	3	3	3	3	3	3
Dozer (165 nhp) Opr	1	2	2	2	2	2	2	2	2	2	2
Tire Dozer Operator	4	8	9	9	9	9	9	8	8	8	8
Water Truck Operator	2	4	6	5	5	5	5	4	3	3	3
Grader Operator	2	4	6	5	6	5	5	3	3	3	3
Rock Breaker Operator	1	1	1	1	1	1	1	1	1	1	1
Blasting Crew	2	2	2	2	2	2	2	2	2	2	2
General Laborer	3	3	3	3	3	3	3	3	3	3	3
Subtotal	39	86	113	108	109	104	110	87	72	76	71
Mine Maintenance:											
Mechanic	7	16	22	22	22	22	22	17	15	15	14
Mechanic Helper	3	8	10	10	10	10	10	8	7	7	6
Welder	4	10	12	12	12	12	12	9	8	8	7
Electrician	2	4	5	5	5	5	5	4	3	3	3
Fuel & Lube Man	2	3	3	3	3	3	3	3	3	3	3
Tire Man	1	2	2	2	2	2	2	2	2	2	2
Subtotal	19	43	54	54	54	54	54	43	38	38	35
Total Hourly Labor	58	129	167	162	163	158	164	130	110	114	106

Note: The cost of additional hourly people to cover vacations, sickness, and absenteeism is included in the 39 percent fringe benefits.

Table 2-6

Brohm, Gilt Edge Project
Mine Capital Cost Estimate

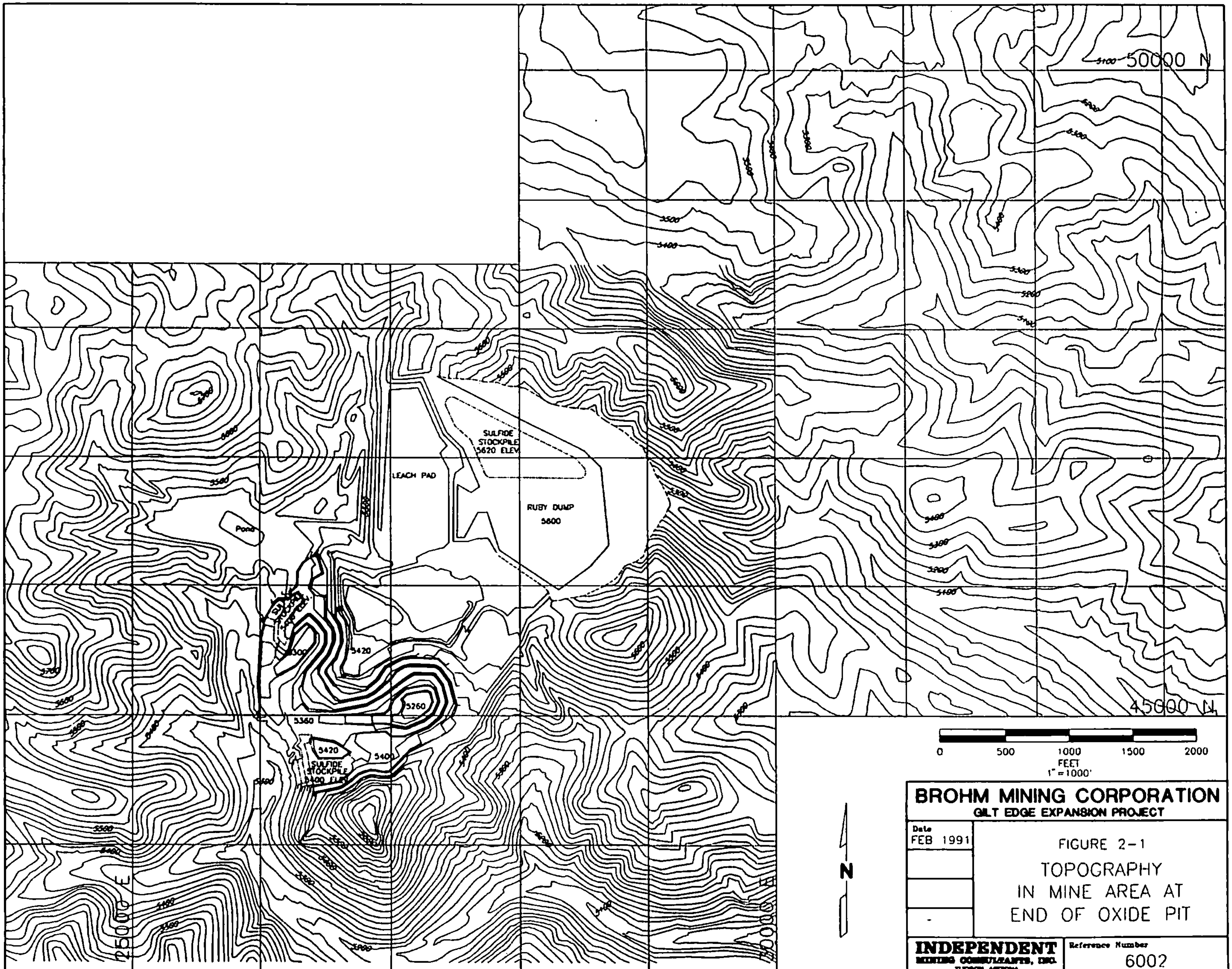
	Unit Cost $ x 1000	Preprod No. Units	Preprod Cost $x1000	Year 1 No. Units	Year 1 Cost $x1000	Year 2 No. Units	Year 2 Cost $x1000	Year 5 No. Units	Year 5 Cost $x1000	Year 7 No. Units	Year 7 Cost $x1000
Major Mine Equipment											
Blast Hole Drill (7.25 in)	410	2	820	1	410						
Air Track Drill (3 in)	204	1	204								
Hydraulic Shovel (13.5 yd)	1445	2	2890	1	1445						
Front End Loader (13.5 yd)	794	1	794							0.5	380
Haul Truck (85 ton)	592	7	4144	4	2368	6	3552				
Track Dozer (370 hp)	406	2	812					2	812		
Track Dozer (285 hp)	302	1	302					1	302		
Track Dozer (165 hp)	173	1	173					1	173		
Wheel Dozer (310 hp)	288	3	864					3	864		
Motor Grader (16 ft)	327	1	327	1	327			1	327		
Water Truck (8000 gal)	312	1	312	1	312						
Rock Breaker	137	1	137								
Minor Mine Operations Equipment											
Backhoe (1-2 yd)	209	1	209								
ANFO/Slurry Truck	187	1	187								
Tool Carrier	111	1	111								
Powder Crew Truck	31	1	31								
Stemming-Sander Truck	83	1	83								
Man Van (4x4)	31	1	31								
Pickups (4x4)	19	8	152					8	152		
Ambulance	35	1	35								
Fire Trailer	26	1	26								
Light Plants	14	6	84					6	84		
Mine Pumps	41	1	41	1	41			1	41		
Mine Radios	49	1	49								
Safety Equipment	11	1	11								
Engineering Equipment	57	1	57								
Minor Maintenance Equipment											
Rough Terrain Crane	208	1	208								
Lube Truck	166	2	332					2	332		
Fuel Truck (5000 gal)	83	1	83					1	83		
Boom Truck (20 ton)	135	1	135								
Tire Truck	90	1	90								
Forklift-Tire Handler	54	1	54								
Forklift Shop/Warehouse	49	1	49								
Mechanics Truck	83	2	166								
Welding Truck	52	1	52								
Supply Flatbed	41	1	41								
Pickups (4x4)	19	2	38					2	38		
Maintenance Computer	40	1	40								
Shop Crane	140	1	140								
Shop Tools (3% of Major Equip)			353								
Spare Parts (2% of Major Equip)			236								
Mine Structures											
Blasting Agent Storage	15		15								
Explosives Magazine	12		12								
Total Capital $ x 1000			14930		4903		3552		3208		380

Table 2-7

Brohm Gilt Edge Project

Operating Cost Summary
Cost per Ton of Total Material

Period	Total Mine Production (kton)	Dollars per Total Ton Drill	Blast	Load	Haul	Auxil	GMine	GMaint	G&A	Total
Prep	9957	0.0955	0.0915	0.1084	0.2067	0.1877	0.0189	0.0201	0.2714	1.0002
Year 1	18153	0.0918	0.0796	0.1010	0.2073	0.1150	0.0128	0.0152	0.1333	0.7560
Year 2	22702	0.0807	0.0999	0.0932	0.2613	0.1111	0.0122	0.0142	0.1224	0.7950
Year 3	22699	0.0847	0.0911	0.0900	0.2545	0.0987	0.0122	0.0142	0.1204	0.7658
Year 4	22700	0.0845	0.0902	0.0900	0.2561	0.1023	0.0122	0.0142	0.1208	0.7703
Year 5	22703	0.0889	0.0849	0.0905	0.2333	0.0981	0.0122	0.0142	0.1188	0.7409
Year 6	22709	0.0821	0.0952	0.0896	0.2657	0.0984	0.0122	0.0142	0.1211	0.7785
Year 7	15798	0.0789	0.1036	0.0960	0.2855	0.1214	0.0132	0.0160	0.1535	0.8681
Year 8	10555	0.0791	0.1056	0.1032	0.3321	0.1758	0.0148	0.0190	0.2116	1.0412
Year 9	10171	0.0791	0.1059	0.1033	0.3853	0.1844	0.0150	0.0194	0.2232	1.1156
Year 10	4273	0.0783	0.1051	0.1054	0.4188	0.2161	0.0159	0.0212	0.2568	1.2176
Average		0.0844	0.0938	0.0949	0.2653	0.1210	0.0131	0.0155	0.1472	0.8352


50000 N
45000 N
25000 E
30000 E
SULFIDE STOCKPILE 5620 ELEV.
LEACH PAD
RUBY DUMP 5600
Pond
5420
5300
5360
5260
5400
SULFIDE STOCKPILE 5400 ELEV.
0
500
1000
1500
2000
FEET
1" = 1000'
N
BROHM MINING CORPORATION
GILT EDGE EXPANSION PROJECT
Date
FEB 1991
FIGURE 2-1
TOPOGRAPHY
IN MINE AREA AT
END OF OXIDE PIT
INDEPENDENT
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Reference Number
6002

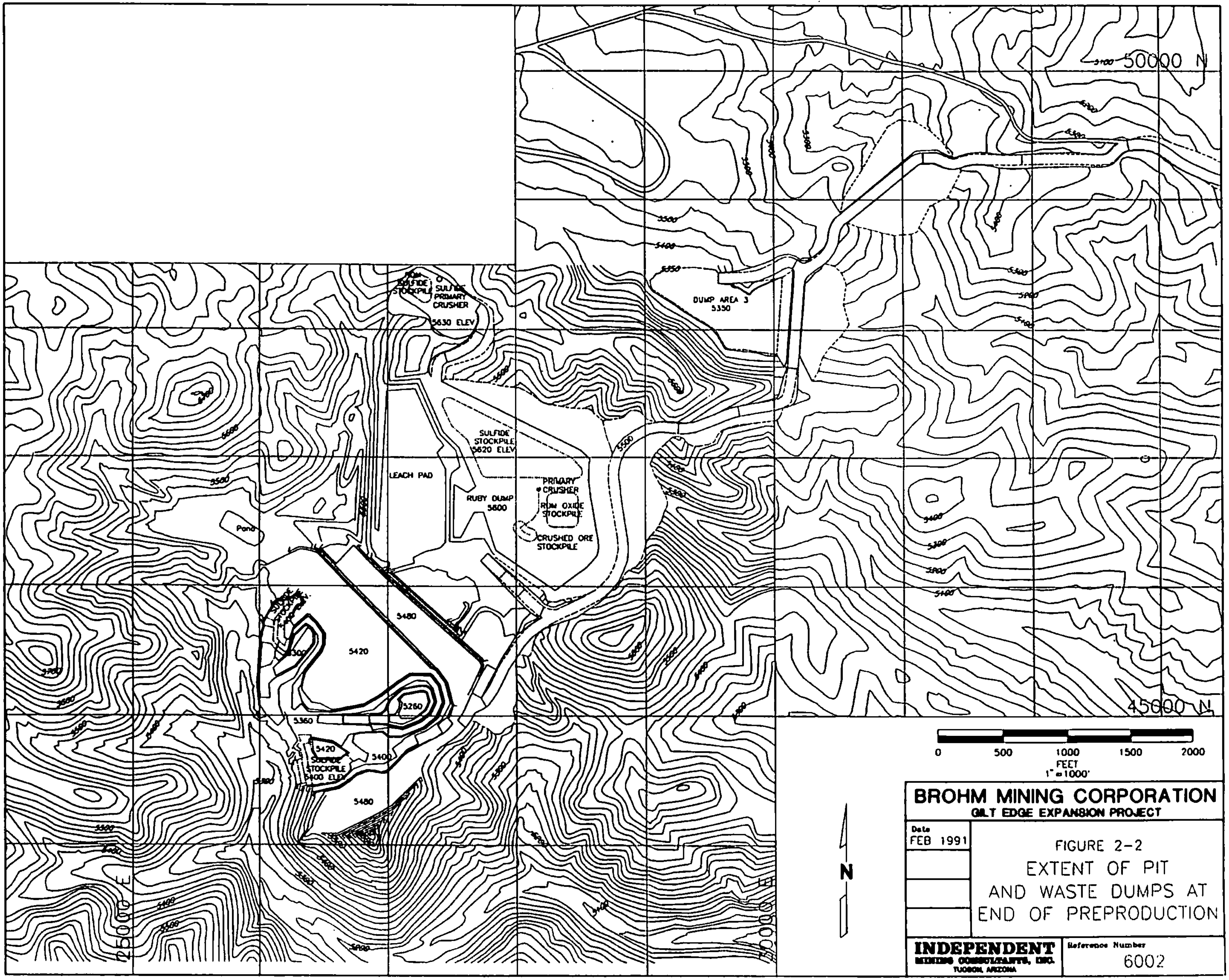

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FIGURE 2-2
EXTENT OF PIT
AND WASTE DUMPS AT
END OF PREPRODUCTION

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TUCSON, ARIZONA

Reference Number
6002

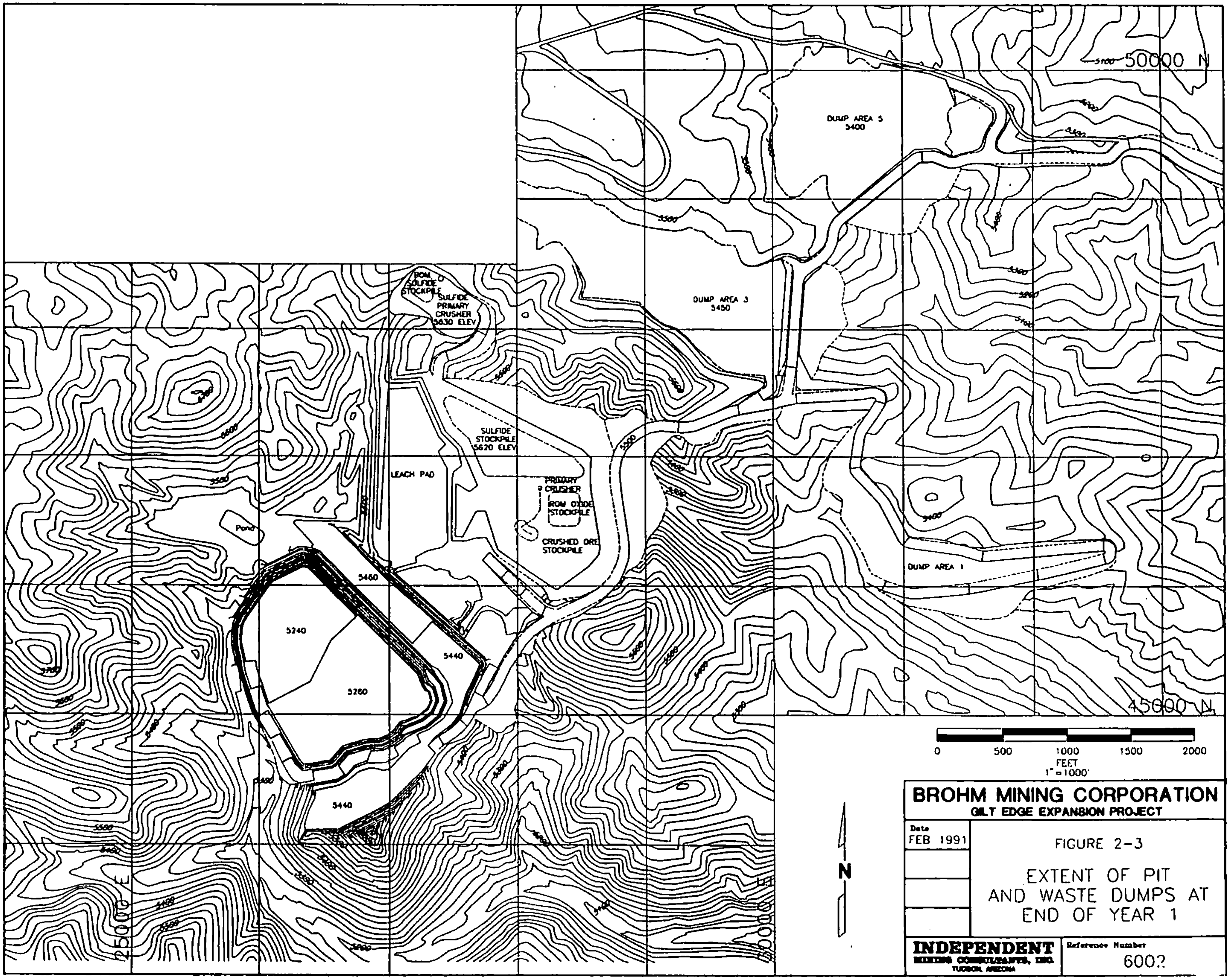
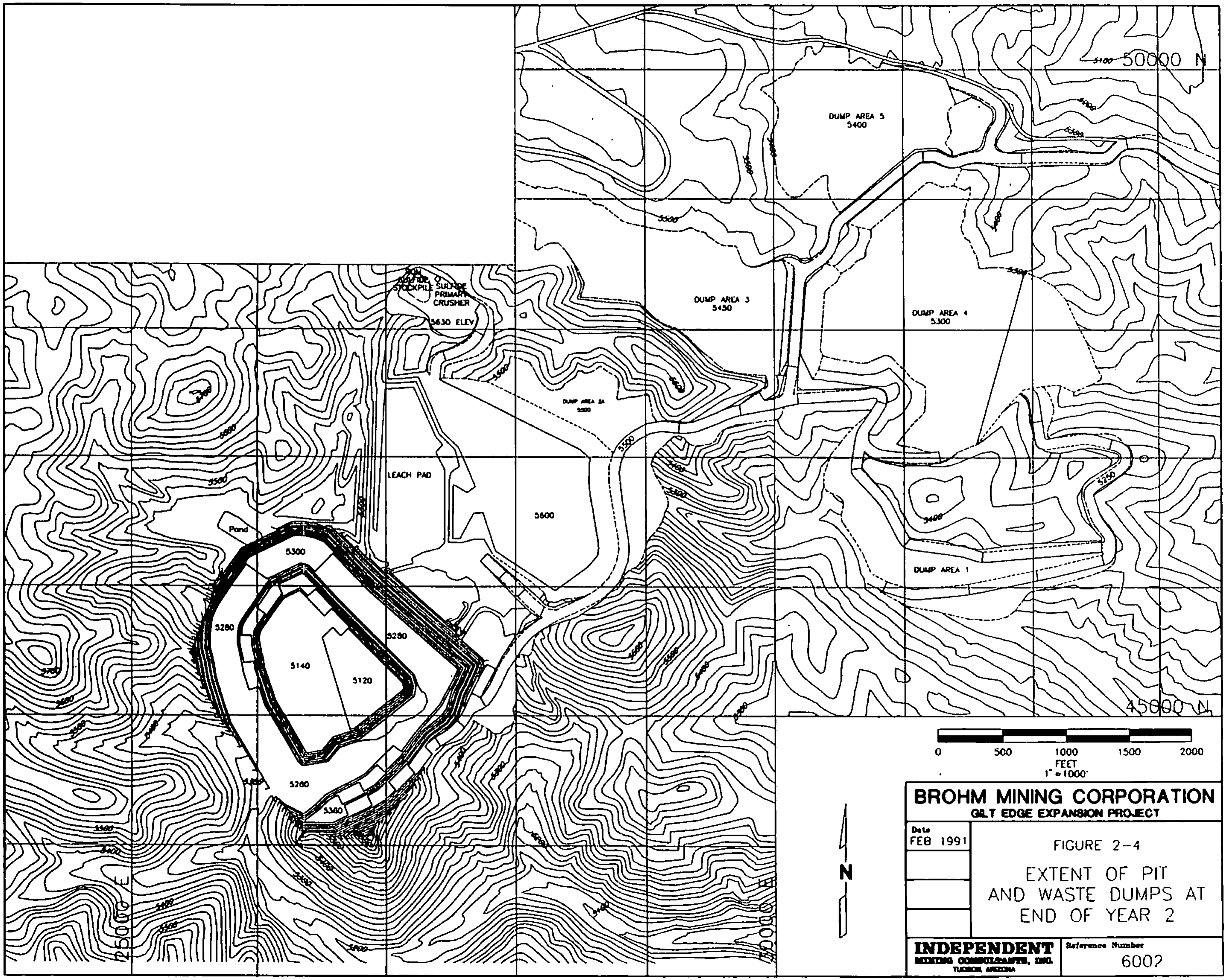
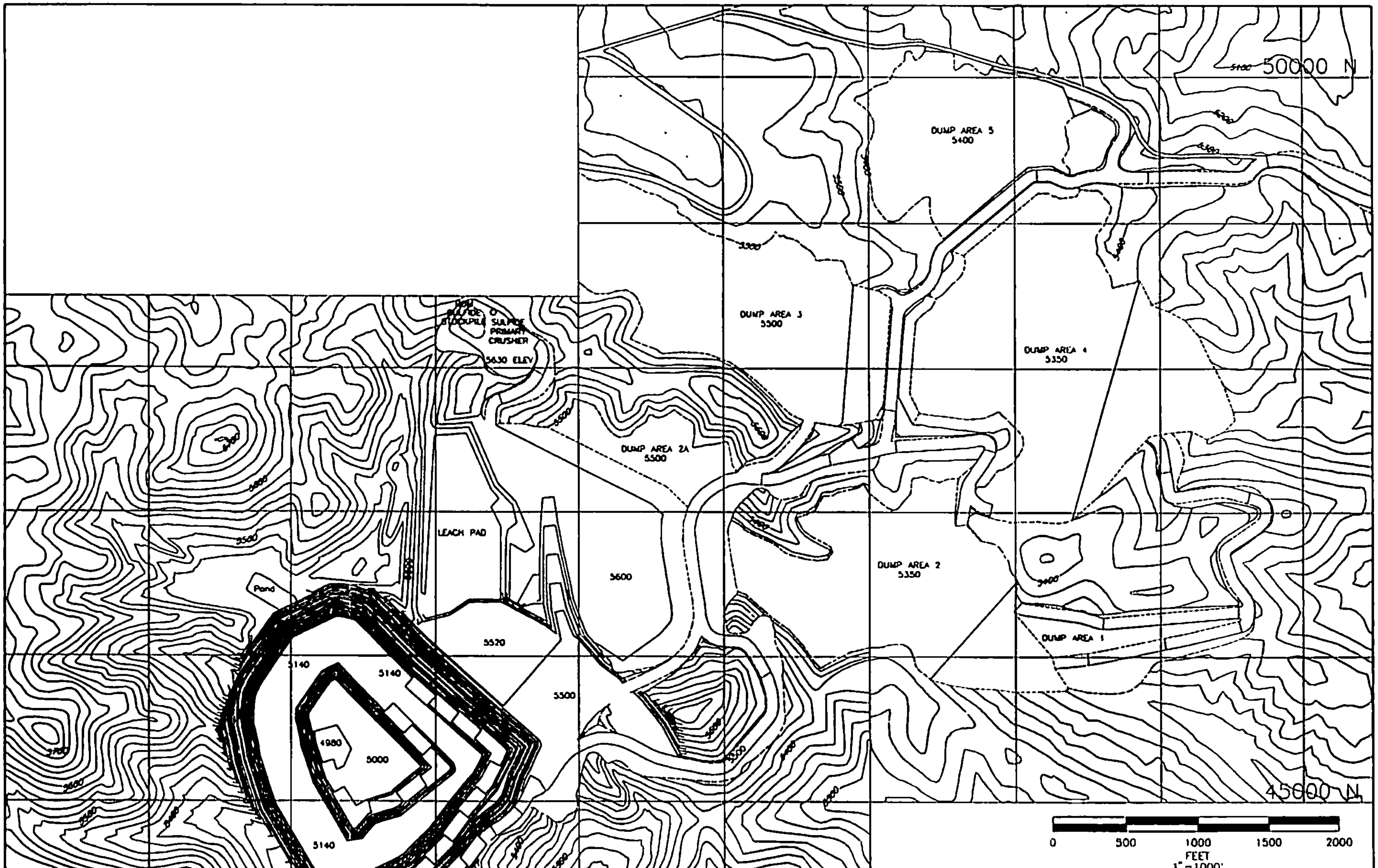


FIGURE 2-3

EXTENT OF PIT AND WASTE DUMPS AT END OF YEAR 1



50000 N
45000 N
DUMP AREA 5
5400
DUMP AREA 3
5450
DUMP AREA 4
5300
DUMP AREA 2A
5500
DUMP AREA 1
SULFIDE
STOCKPILE
SULFIDE
PRIMARY
CRUSHER
5630 ELEV.
LEACH PAD
5600
Pond
5300
5280
5140
5120
5260
5360
0
500
1000
1500
2000
FEET
1" = 1000'
N
BROHM MINING CORPORATION
GILT EDGE EXPANSION PROJECT
Date
FEB 1991
FIGURE 2-4
EXTENT OF PIT
AND WASTE DUMPS AT
END OF YEAR 2
INDEPENDENT
MINING CONSULTANTS, INC.
TUCSON, ARIZONA
Reference Number
6002



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Date
FEB 1991

FIGURE 2-5
EXTENT OF PIT AND WASTE DUMPS AT END OF YEAR 3

INDEPENDENT MINING CONSULTANTS, INC.
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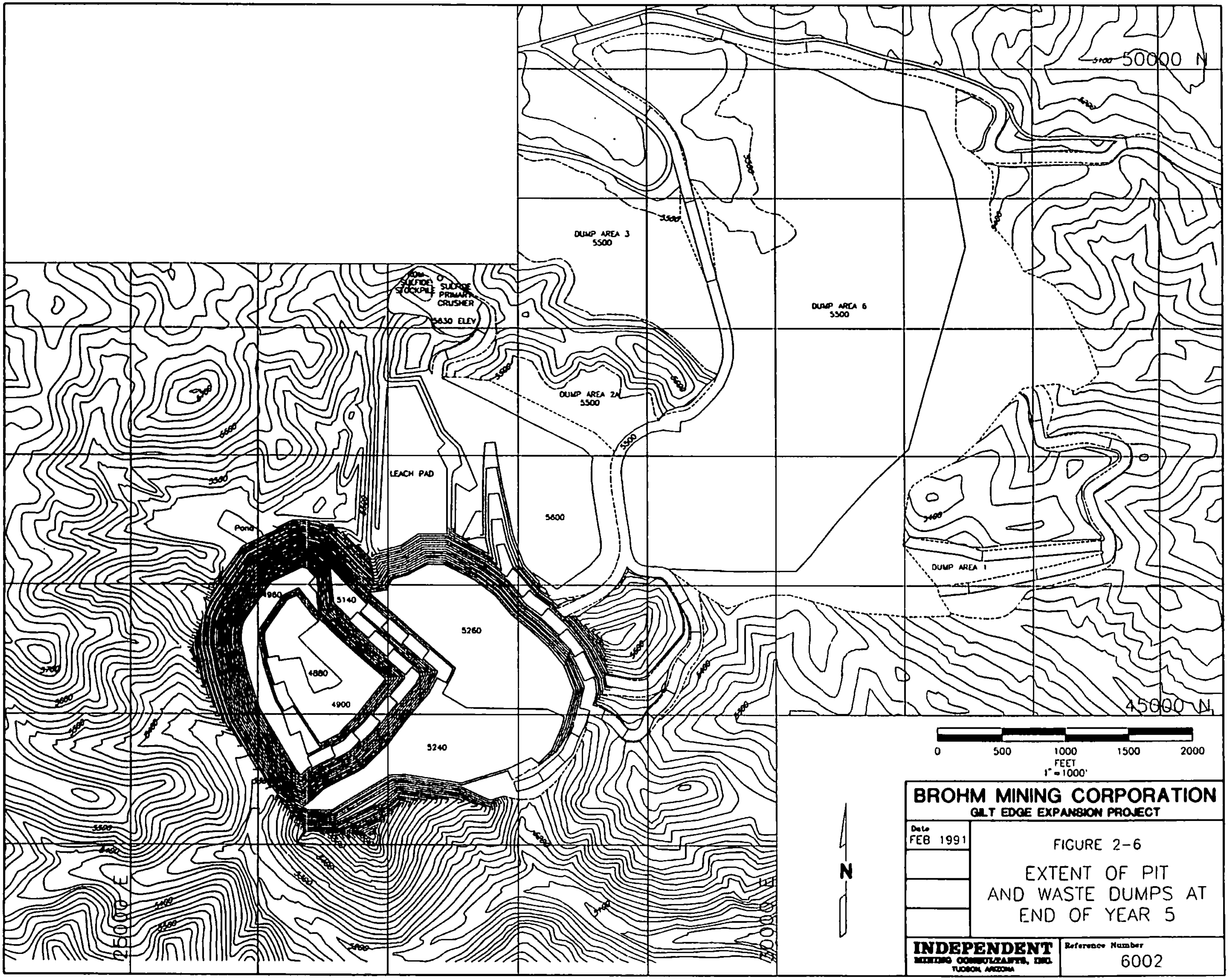
Reference Number
6002



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Date FEB 1991

FIGURE 2-6

EXTENT OF PIT AND WASTE DUMPS AT END OF YEAR 5

INDEPENDENT MINING CONSULTANTS, INC.
TUCSON, ARIZONA

Reference Number 6002

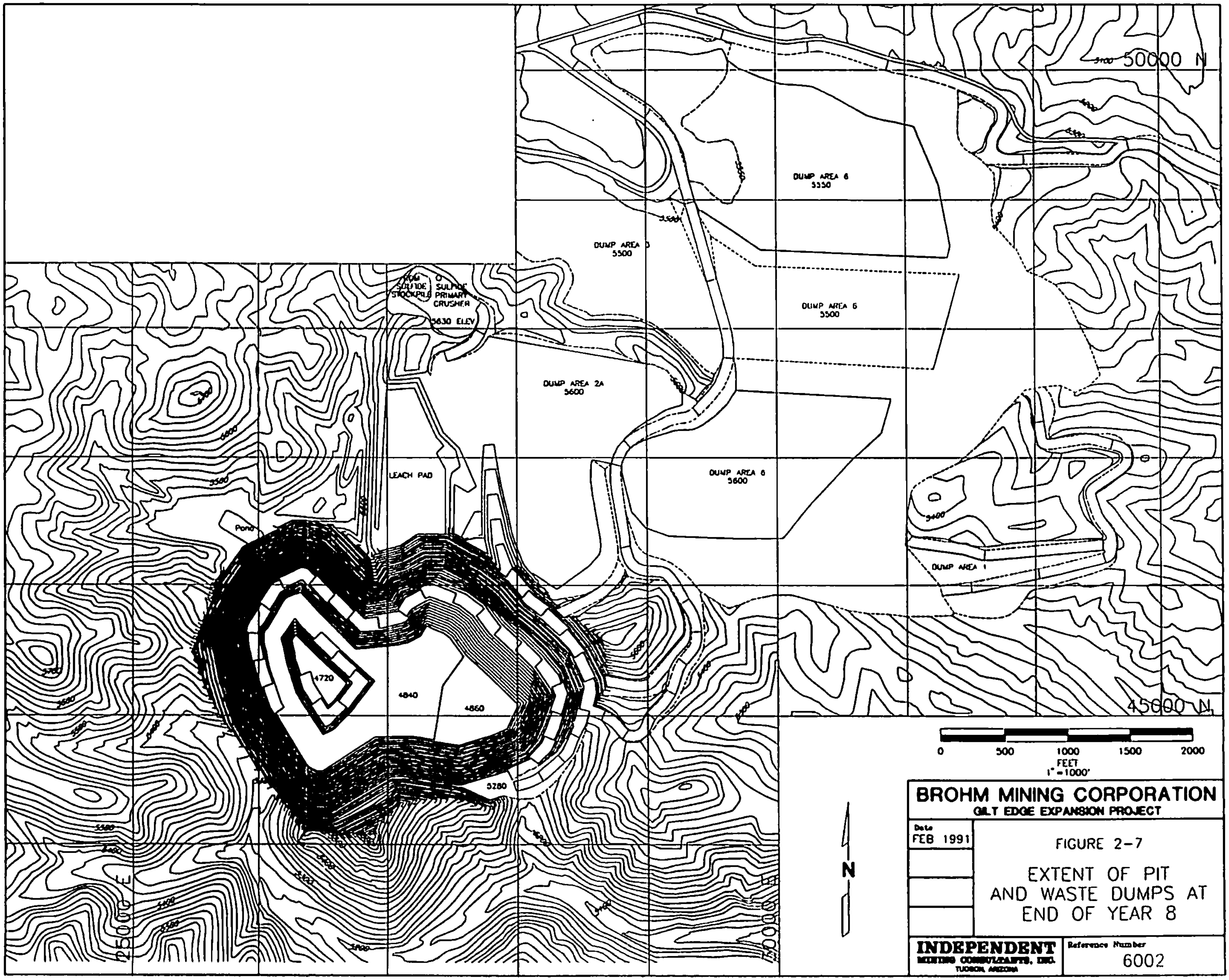

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FIGURE 2-7

EXTENT OF PIT AND WASTE DUMPS AT END OF YEAR 8

INDEPENDENT MINING CONSULTANTS, INC.
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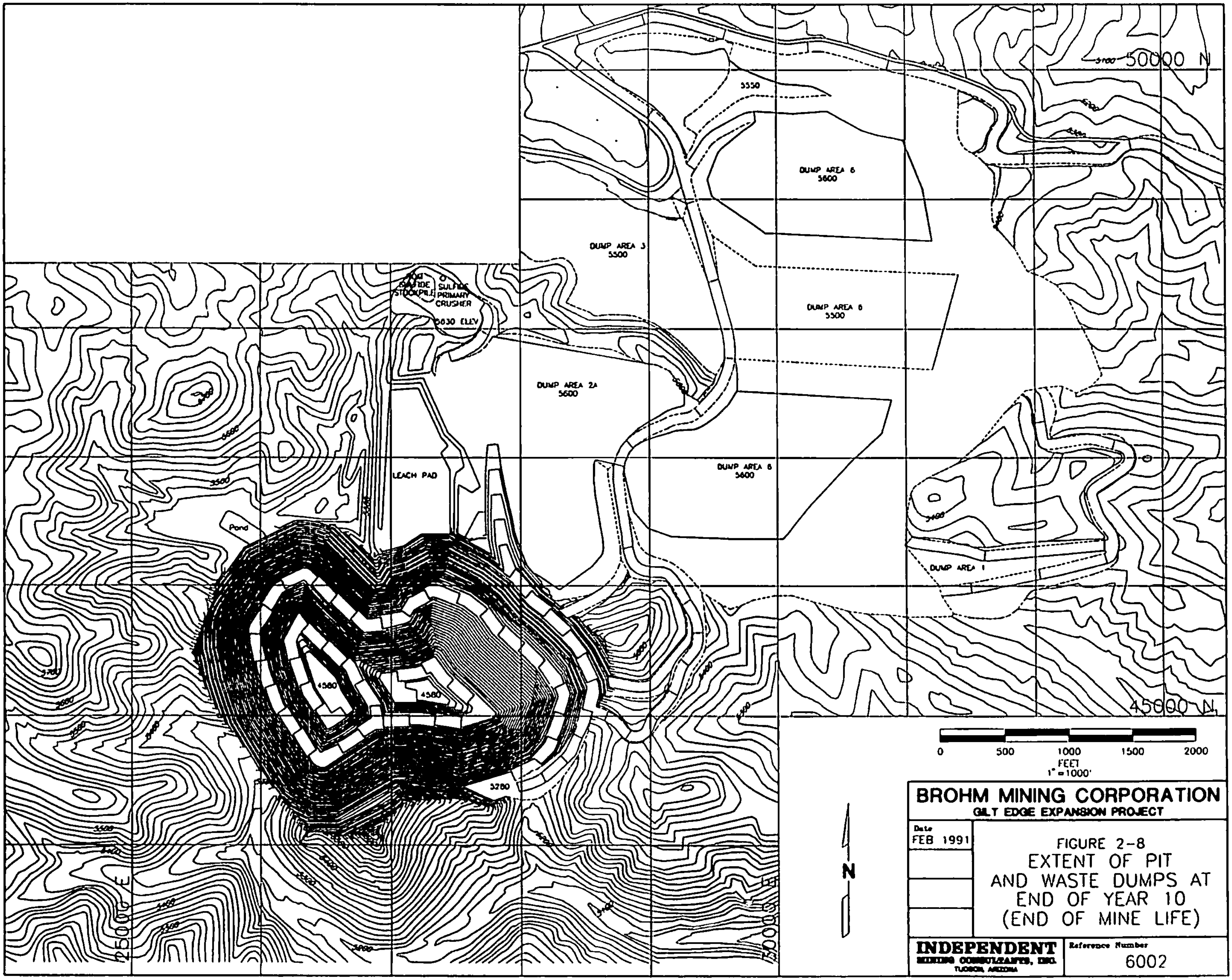
Reference Number
6002


50000 N
45000 N
25000 E
30000 E
DUMP AREA 6
5600
DUMP AREA 3
5500
DUMP AREA 6
5500
DUMP AREA 2A
5600
DUMP AREA 6
5600
DUMP AREA 1
LEACH POD
Pond
SULFIDE STOCKPILE
SULFIDE PRIMARY CRUSHER
5630 ELEV
4560
4560
3780
0 500 1000 1500 2000
FEET
1" = 1000'
N
BROHM MINING CORPORATION
GILT EDGE EXPANSION PROJECT
Date
FEB 1991
FIGURE 2-8
EXTENT OF PIT AND WASTE DUMPS AT END OF YEAR 10 (END OF MINE LIFE)
INDEPENDENT MINING CONSULTANTS, INC.
TUCSON, ARIZONA
Reference Number
6002

3.0 ORE RESERVE MODEL

3.0 ORE RESERVE MODEL

3.1 Geology, Structure and Mineralization

The Gilt Edge mine is located in a west-northwest trending belt of Early Tertiary intrusive rocks which cut the Precambrian, Paleozoic and Mesozoic rocks of the Black Hills dome. In the immediate mine area, trachytic stocks and sills of early Tertiary age have intruded Precambrian metasediments and Cambrian sediments of the Deadwood formation. The general sequence of intrusion has been a) hornblende trachyte sills, b) trachyte porphyry stocks and c) quartz trachyte porphyry stocks.

Gold mineralization at Gilt Edge occurs dominantly in trachyte porphyry around the margin of two quartz trachyte porphyry stocks (the Langley and the Union Hill stocks), and to a lesser extent in the Precambian metasediments and the Deadwood formation. The quartz trachyte porphyry stocks are generally not good ore hosts, and contain only irregular ore-grade intercepts.

Gold deposition is felt to be controlled by structures and by the degree of fracturing. The trachyte porphyry, which is the main ore host, is comparatively well fractured and frequently brecciated along its contact with the quartz trachyte porphyry, while the quartz trachyte porphyry is comparatively massive. Several high-angle structures and/or structural zones which transgress the mine area are believed to have controlled gold deposition on the local scale.

Gold mineralization was accompanied by the introduction of pyrite and minor amounts of silver, copper, lead and zinc. Pyrite averages 3 to 4% by volume below the base of oxidation, which normally occurs at a depth of a few hundred feet below natural topography. "Mixed" ore occurs in the zone of partial oxidation between the oxide and the sulfide zones. Gold has been identified as occurring either as free gold, as finely dispersed grains on the surface of pyrite crystals, or encapsulated within silicate gangue or pyrite grains.

Argillic, sericitic and potassic alteration suites have been recognized in the mine area. No significant propylitic alteration zone has been identified, but this could reflect the absence of reactive mafics in the host rocks.

Geology, structure and mineralization at Gilt Edge appear to be well documented and understood. A more complete description is provided in Section 3 of the Plan of Operations that Brohm Mining Corporation filed with the U.S. Forest Service in June, 1990.

3.2 Drilling, Sampling and Assaying

The results of 777 holes comprising a total of 432,949 ft of drilling have been used to construct the Gilt Edge ore reserve model. This drilling is summarized by operator, period and drilling technique in Table 3-1 below:

TABLE 3-1

SUMMARY OF DRILLING CONDUCTED AT GILT EDGE

COMPANY	YEAR	ROTARY		CORE		TOTAL	
		Holes	Ft.	Holes	Ft.	Holes	Ft.
Congdon & Carey	1968-1969	0	0	11	9,955	11	9,955
Cyprus-Amoco	1975-1982	237	59,038	37	33,651	274	85,599
Lacana	1983-1985	66	19,035	12	8,482	78	27,517
Brohm	1987-1990	402	298,184	12	4,604	414	302,788
TOTALS		705	376,257	72	56,692	777	432,949

A total of 305,274 ft of the rotary drilling was performed with reverse circulation (RC) techniques. The average depth of the rotary holes is 533.7 ft and the average depth of the core holes is 787.4 ft. Rotary hole diameters were normally 5.5 or 6 inches, and core holes were generally drilled HQ or NQ. A total of 86 holes (39 rotary and 47 core) were angled holes, and the remainder were vertical.

The separation between "nearest neighbor" drillholes averages 86 ft in the drilled area. At the 5,100 ft level (about 400 ft below topography) the average nearest neighbor hole separation is 102 ft. Both figures ignore holes which are separated by less than 25 ft (which are considered to be "twinned").

These drillhole separations are generally adequate to define the distribution of gold ore at shallower levels in the Gilt Edge deposit. The impact of drillhole separation on ore definition at deeper levels is discussed in Section 3.10.

A total of 119 holes were downhole surveyed with angle shot, multi-shot or acid etch techniques. Core holes and shallow rotary holes generally show no significant deviation. Some of the deeper vertical rotary holes show horizontal deviations of up to 100 ft. Angled rotary holes were not surveyed.

There is a possibility that some of the deeper unsurveyed RC holes at Gilt Edge may be mislocated by several tens of feet. However, for reasons discussed in Section 3.10, it is not felt that these mislocations are likely to introduce significant errors into geologic or mineable ore reserve calculations.

Visual examination of the Gilt Edge storage warehouse confirmed that core recovery was generally close to 100%. Rotary sample recovery was reportedly also close to 100%. Split core, sample rejects and drill logs/assay results are generally well tabulated and accessible.

RC sampling was conducted using a dual cyclone in dry rock and a variable speed rotating wet splitter below the water table. Drill core was split for assay. Detailed sampling and assaying protocols have been prepared by Gilt Edge staff.

Assays were performed at 5 ft and 10 ft intervals prior to 1985, and at 5 ft intervals thereafter. Samples were sent to Bondar-Clegg in Deadwood, S.D. for drying and splitting, and to Bondar-Clegg in Denver or Reno for fire assay. Check assays were then performed by Strawberry Hill Mining Company and Barringer Labs, and Bondar-Clegg rechecked the Barringer sample. Assays reportedly repeated within +/- 8 percent, with the differences between labs being random rather than systematic. This is an acceptable range for gold check assays.

In order to check for possible systematic differences between core hole and RC hole gold assays, four HQ core holes were "twinned" with pre-existing RC holes in 1987, and eight 6-inch core holes were twinned with other pre-existing RC holes in 1988. All twinned pairs of holes were collared within about ten feet of each other.

A summary comparison of the gold assays over comparable depth intervals for the eight twinned holes drilled in 1988 is given in Table 3-2 below. The 6-inch core holes that were twinned with the RC holes were also drilled to obtain samples for metallurgical testing and for density measurements.

TABLE 3-2

1988 TWINNED HOLE GOLD ASSAYS

RC HOLE	CORE HOLE	INTRVL(FT) RC	CORE	RC ASSAY (oz/ton)	CORE ASSAY (oz/ton)	CORE/RC (%)
88-366	88-65	375	361	.050	.053	6.0
88-377	88-66	140	133	.054	.033	-38.9
88-385	88-67	280	274	.053	.057	7.5
88-427	88-68	230	219	.077	.070	-9.1
88-368	88-69	210	196	.059	.074	25.4
88-395	88-70	95	83	.035	.069	97.1
87-329	88-71	25	22	.030	.035	16.7
88-409	88-72	150	126	.051	.028	-45.1
TOTAL ALL HOLES		1,505	1,414	.055	.056	1.8

While large variations in RC and core hole grade occur between individual twinned holes, the mean gold grades for all twinned holes compare very closely. These results indicate that there is no systematic variation between gold assays taken from core samples and RC samples, but that there is significant variability in gold grade over short horizontal distances in the deposit. This variability most likely reflects the preferential deposition of gold in narrow sub-vertical structures which have only very limited horizontal extent.

Assays from the 1987 holes generally showed higher gold in core holes than in RC holes over the same interval. However, these results are less statistically meaningful because the number of RC assays for the 1987 twinned holes significantly exceeded the number of core assays. To the extent that these results do have statistical significance, they would indicate that RC drilling is tending to underestimate rather than overestimate gold content. Since most of the deposit has been sampled with RC drilling techniques, the net impact would be to understate rather than overstate gold grades.

Visual examination of drillhole assays does not indicate any obvious dependence of gold grade on drilling technique. There is no evidence of sample mixing or contamination in RC holes below the water table.

A limited number of samples have been assayed for silver. These indicate that the silver:gold ratio at Gilt Edge is about 9:1. However, low recoveries limit the economic significance of the silver, and silver credits are not taken into account in ore reserve calculations and mine planning.

Blast holes in the present oxide pit are drilled on 13 ft centers and assayed for gold with AA. Ten percent of the oxide assays are checked with fire assay, and all sulfide material and mixed material with a dominant sulfide component is assayed by fire. All AA assays are factored to fire assay equivalents. Fire equivalent blast hole assays are sufficiently coherent to be contoured on bench plans, and average blast hole grades compare quite well with the grades projected from the ore reserve model, as discussed in Section 3.9. Blast hole sampling procedures appear to be acceptable, but assays are not used in the model.

3.3 Description of Ore Reserve Block Model

The Gilt Edge ore reserve model was constructed by Brohm Mining using MEDSYSTEM, an ore reserve estimation software package which is in common use in the mining industry.

The Gilt Edge model is 6,000 ft east-west by 5,300 ft north-south by 1,740 ft vertically. The bounding coordinates are 43,100N to 48,400N and 24,000E to 30,000E, and the model extends from 4,000 ft to 5,740 ft elevation above sea level. With a block size of 50 ft by 50 ft by 20 ft, the number of blocks in the model totals 1.1 million. Of this total, approximately 900,000 blocks are in rock, with the remainder being above topography.

The 20 ft vertical block height matches the 20 ft bench height which is currently used in the Gilt Edge oxide pit, and which is proposed for the sulfide pit. No bench height optimization studies have been carried out for Gilt Edge, but a 20 ft bench height is common at open-pit precious metal mines in the western US.

Basic input to the Gilt Edge model consists of gold assays, rock type, structural type and bulk density. The assay, rock type and structural data are used to define the distribution of gold grades in the deposit through the application of geostatistical and related procedures which assign specific gold grades to each block in the model. Densities are used to estimate tonnages.

The Gilt Edge model ultimately permits the mineral inventory at different cutoff grades to be calculated. The mine planning software used to define mineable reserves and to design pit limits also operates on the model.

3.4 Assay Compositing Procedures, Capping

Raw assay data for Gilt Edge have been compiled from the original 5 ft or 10 ft assay intervals into 20 ft composites which correlate with the 20 ft vertical block intervals in the model.

Before compositing, a total of 210 isolated, higher-grade assays were "cut" by factors of between five, eight or ten depending on the amount by which the assay exceeded the surrounding lower-grade assays. These procedures were established on the basis of variance ranges between individual assays. The average grade of the 210 assays was .277 oz/ton before cutting and .106 oz/ton after cutting. These assay cuts affected 268 composites, reducing the average grade of these composites from .078 oz/ton to .040 oz/ton.

The resulting composite grades were then capped. Cap grades were established by constructing cumulative frequency plots for major rock types in order to define discrete high-grade populations, and by capping all assays to the lower limit of the high-grade population. The cap grades that were established by these means ranged from around 0.5 oz/ton in the trachyte porphyry to around 0.07 oz/ton in the quartz trachyte porphyry.

The procedures used to cap assays and composites appear to be appropriate.

3.5 Geologic and Structural Boundaries

Geologic and structural boundaries identified from drilling and from surface and underground mapping have been used extensively to control geostatistical analysis and mineral inventory calculations at Gilt Edge.

In addition to the three ore types, a total of 10 different rock types and 12 individual structural zones have been identified in and around the Gilt Edge deposit. The main rock types are trachyte porphyry, breccia, quartz trachyte porphyry, Cambrian Deadwood formation and foliated Precambrian basement. The twelve structural zones strike generally northwest or northeast and are sub-vertical (dips range from 71 to 86 degrees).

East-west sections drawn at a scale of 1" = 50 ft and spaced 50 ft apart are used as the basis for correlating geology, structure and gold grades within the deposit. Such sections have also been used to correlate all significant gold intercepts in relation to structural and rock type boundaries both along and between sections in order to develop a hand-calculated ore reserve. The results of this are discussed in Section 3.8.

Generally, higher-grade gold intercepts are interpreted to follow structural zones, and also to be controlled by the trachyte porphyry - quartz trachyte porphyry contact. Plan maps of gold distribution show that gold mineralization occurs dominantly in trachyte porphyry and breccias, and to a lesser extent in the Cambrian and Precambrian formations, around the north edge of the Langley quartz trachyte porphyry stock and around the southern edge of the Union Hill quartz trachyte porphyry stock. The Langley and Union Hill stocks themselves are generally only poorly mineralized. It is clear that gold mineralization at Gilt Edge tends to be concentrated around the margins of the quartz trachyte porphyry stocks, and that it tends to diminish with distance from the stock contacts.

In order to perform a general check on the validity of the geologic and structural boundaries used to constrain ore reserve determinations, IMC compared raw gold assays with geology and structure on selected sections and plans drawn through the Sunday and Dakota Maid deposits.

Comparison of raw gold assays with geology and structure on the 1" = 50 ft sections shows areas where geologic and structural boundaries clearly control mineralization, and other areas where the correlation is less obvious. In general, the better-grade mineralization appears to occur in reasonably coherent zones some hundreds of feet across. These zones are located in the trachyte porphyry adjacent to the quartz trachyte porphyry, and they do not exhibit any strong preferred orientation. Gold grades generally drop off abruptly across the trachyte porphyry - quartz trachyte porphyry contact, but there are some instances in which the cutoff is less abrupt, and others where gold grades in the quartz trachyte porphyry exceed those in the trachyte porphyry.

Bench-level gold grade maps prepared from blast hole assays again show that gold mineralization in the trachyte porphyry occurs in reasonably coherent areas some hundreds of feet across. However, higher-grade gold tends to occur in pockets with preferred northeast or northwest orientations, roughly paralleling the strike of the identified structural zones. The larger higher-grade zones average about 100 ft by 50 ft in horizontal extent.

These reviews of the geologic and structural parameters used as controls on ore distribution in the orebody model indicate that while localized exceptions exist, the important geologic and structural controls on mineralization at Gilt Edge have been correctly identified and applied.

3.6 Bulk Density Estimates

Bulk densities are ascribed to different rock types and/or ore types in order to calculate tonnages. At Gilt Edge, all densities and tonnages are reported on a dry basis. Moisture content in the rocks is in the range of 6 to 8%.

Bulk densities at Gilt Edge are determined from specific gravity measurements performed on drill core or on bulk samples.

The bulk densities presently being used to calculate tonnages at Gilt Edge are summarized by rock type and ore type in Table 3-3 below:

TABLE 3-3

BULK DENSITIES BY ROCK TYPE AND ORE TYPE

ROCK TYPE	BULK DENSITY (CU FT/TON)		
	SULFIDE	MIXED	OXIDE
Trachyte porphyry Hornblende trachyte porphyry Breccia	12.5	12.8	13.1
Quartz trachyte porphyry	11.2	11.4	11.7
Deadwood formation Precambrian basement	11.5	11.7	12.0

Mixed ore is assumed to be composed of 50% sulfide and 50% oxide material. Bulk densities for mixed ore are therefore an average of the bulk densities for oxide and sulfide ore, rounded down to the nearest 0.1 cu ft/ton.

3.7 Geostatistical Procedures and Block Grade Calculations:

Variograms were prepared for various rock types and structural zones, and for various combinations of the two, to establish search distances. In order to obtain enough assay pairs, parallel structures or structures with similar means and standard deviations were grouped together. Because gold distribution is not significantly modified by oxidation, no distinction was made between sulfide, mixed or oxide ore.

Search distances were established on the basis of the variogram ranges for over twenty different rock types or rock type - structural zone combinations. In structural zones, search distances along strike and down dip ranged from 100 to 275 ft, while search distances perpendicular to strike ranged from 50 to 100 ft. Outside the structural zones, spherical searches with radii of between 50 and 125 ft were used.

Block grades were calculated using the inverse distance squared (ID2) method. The ID2 method was selected because it generates tonnage and grade estimates which correlate acceptably with blast hole tonnages and grades (see Section 3.9 and Appendix R), and because it gives similar results to ordinary kriging while being faster. A minimum of two composites within the search distance was required in order to calculate a block grade.

The calculation of block grades was also constrained by rock type and structural boundaries so that composites located in certain structural zones and/or rock types were not allowed to contribute to block grades in other structural zones and/or rock types even if they fell within the search distance. In some cases, these boundaries were "hard" in one direction and "soft" in the other (composite grades in the quartz trachyte porphyry, for instance, could contribute to block grades in the trachyte porphyry, but not vice versa). Boundary constraints were established so as to analogue the ore controls identified from geologic analysis, and to prevent smearing of gold grades from favorable host rocks and structural zones into less favorable units.

The geostatistical procedures and boundary constraints that have been used to develop block grades for Gilt Edge have not been reviewed in detail. In general, it appears that the search distances are reasonable in relation to the variogram ranges and the drillhole spacing, that the ID2 method calculates acceptable block grades (see discussion in the following sections and in Appendix R), and that the tight boundary constraints have minimized any possibility of "smearing" grades across mineral boundaries.

IMC prepared sections and plans through the Sunday and Dakota Maid deposits in order to compare ID2 block gold grades with raw assay grades, geology/structure and bench level blast hole assays. These comparisons showed no obvious discontinuities between "raw" and "block" gold grades. However, it was noted that boundary constraints had in some cases been applied so tightly as not to assign grades to a number of blocks that are located between closely-spaced ore holes. Visual examination of plans and sections strongly suggests that these "unassigned" blocks should contain ore grade material, yet the model has treated them as waste. This has led to a conservative statement of reserves in some parts of the main ore zones.

It was also noted that the "hard" boundary between the quartz trachyte porphyry and the trachyte porphyry had generated a large number of unassigned blocks adjacent to ore-grade blocks near the southeast contact of the Union Hill stock. These unassigned blocks result from a combination of a) the hard boundary constraint, b) the comparatively low density of drilling within the stock in this area and c) the assumption made in the ore reserve model that the stock contact is located close to mineralized drillholes in the trachyte porphyry and remote from unmineralized drillholes in the quartz trachyte porphyry. While it is appropriate to make conservative assumptions of this type in the absence of data, it should be noted that the orebody model is assuming a worst-case scenario in this instance.

3.8 Mineral Inventory

Since the SEC defines a "reserve" as being that part of a deposit which can be economically mined, the term "mineral inventory" is used in this report in preference to the term "geologic reserve" in order to define mineral resources which are present but not necessarily economically mineable.

The mineral inventories generated from the 90-4J Gilt Edge ID2 model at different cutoff grades are listed in Table 3-4 below:

TABLE 3-4

GILT EDGE MINERAL INVENTORIES

Cutoff	Sulfide		Mixed		Oxide		Total	
(oz/t)	Mtons	oz/t	Mtons	oz/t	Mtons	oz/t	Mtons	oz/t
.000	533.8	.012	28.1	.013	49.5	.014	611.4	.012
.010	215.2	.024	12.1	.025	23.2	.025	250.5	.024
.020	102.2	.036	6.0	.037	11.6	.037	119.8	.036
.030	52.4	.048	3.1	.049	5.8	.050	61.3	.048
.040	27.4	.060	1.7	.061	3.2	.062	32.3	.060

The operating results discussed in the next section provide a check as to the reasonableness of the ID2 method in calculating mineral inventories.

IMC performed further checks by recalculating these mineral inventories, expressed as total ounces of contained gold, using different estimation methods and 20 ft composite grades. A $400 floating cone pit which approximated the ultimate pit was used to confine the reserve determinations. The results are summarized in Table 3-5 below:

TABLE 3-5

COMPARISON OF ID2 MODEL WITH IMC CHECK MODEL

Model	Ounces of Contained Gold at Cutoff:			
	0.02 oz/t	0.025 oz/t	0.03 oz/t	0.05 oz/t
Gilt Edge ID2	2,177,409	1,884,168	1,625,950	808,725
IMC polygon	2,371,700	2,122,974	1,900,405	1,329,174
IMC indicator kriged	1,718,100	1,656,432	1,486,395	781,584

The IMC polygon and indicator kriged (IK) models both employed 150ft isotropic searches on one single bench level. The edges of the zones which the IK model showed to have a better than 50% probability of exceeding cutoff grade were used as "hard pod boundaries", and grades inside these boundaries were estimated by ordinary kriging.

The purpose of running the polygon and IK check models was not to duplicate the ID2 mineral inventory, but to bracket it with different estimation methods which would be expected to provide optimistic (polygonal) and pessimistic (IK) estimates of contained ounces. In this regard, the exercise was a success, with the polygon model estimating more ounces than the ID2 model and the IK model less.

In 1989, Gilt Edge staff estimated a mineable tonnage of 50.9 million tons of 0.05 oz/ton (undiluted above a 0.02 oz/ton cutoff) by detailed manual calculations made on sections. The total contained ounces of gold within this reserve amounted to 2.55 million ounces. This figure compares quite closely with the 2.37 million mineable ounces estimated by the IMC polygon model.

IMC chose to modify the ID2 block grades in only one case. In the Hoodoo area, located to the east of the Sunday pit, some deep model blocks have been assigned ore grades on the basis of assays from one drillhole (R88-478). IMC believes that further drilling will be required before reserves in this zone can be considered proven-probable, and has consequently deleted these blocks in calculating mineable reserves. The impact of the deletion on mineable tonnage and mineral inventory is, however, minor.

3.9 Comparison of Projected Reserves with Operating Results

Blast hole assay data from the oxide operation at Gilt Edge have provided information on mined tonnages and grades for comparison with ore reserve model estimates. Available comparisons are summarized in Table 3-6 below:

TABLE 3-6

ACTUAL VERSUS PROJECTED RESULTS, 5460 THROUGH 5520 BENCHES

1. 0.02 oz/ton cutoff:

KTons		Grade (oz/t)		Oz Au (000)	
Actual	ID2	Actual	ID2	Actual	ID2
1183	1412	.046	.041	54.6	57.4

2. 0.022 oz/ton cutoff:

KTons		Grade (oz/t)		Oz Au (000)	
Actual	ID2	Actual	ID2	Actual	ID2
1183	1304	.046	.043	54.6	55.4

In both cases, the ID2 estimates tend to overstate tonnage and understate grade. This is a common feature of ore reserve estimates made using block models which cannot precisely analogue actual mining procedures or actual gold distribution in the ground. At both cutoffs, however, projected tons, grade and contained ounces are acceptable matches with actual production, and at the 0.022 oz/ton cutoff all three parameters are within 10% of actual figures. The 0.022 oz/ton cutoff is currently used for planning the Gilt Edge oxide operation.

The degree of correlation between actual and project reserves exhibits a dependence on cutoff grade, but since the 0.020 and 0.022 oz/ton cutoff grades generally reflect the range of breakeven and internal cutoff grades for Gilt Edge oxide ore (see Section 4), it is not thought likely that this effect introduces any significant errors into the existing ore reserve estimates.

3.10 Reserve Categorization:

Gilt Edge mineral inventories have generally been calculated using comparatively closely-spaced drillholes, reasonable search distances and conservative boundary constraints. In addition, projected reserves correlate acceptably with actual mined reserves.

The reliability of the geologic ore reserve estimates tends to decrease with depth, partially as a result of wider drillhole spacing, and partially because of potential mislocations of unsurveyed holes. However, mineable ore reserve calculations are not greatly impacted by deep resources, and the possible reserves in the deep Hoodoo area that were discussed in the previous section have been eliminated from consideration in calculating mineable tonnages. IMC believes that possible reserves in other areas will have been excluded from the mineral inventory by the tight boundary constraints that have been used to calculate block grades in the ID2 model.

On this basis, IMC considers that the mineable ore reserves derived from the 90-4J ID2 model can be classified as proven-probable. The procedures used to determine mineable reserves are discussed in Section 4.

4.0 MINE PLANNING

4.0 MINE PLANNING

4.1 Floating Cone Pits:

Floating cones were run on the 90-4J ore reserve model to determine preliminary mineable reserves and to define approximate pit outlines. The preliminary mineable reserves were used to confirm the validity of the ore throughput rates being used in process plant design, and the approximate pit outlines were used to guide the development of mining phases and final pit geometry, as discussed in the next section.

The floating cone pits were defined using the input parameters shown on Table 4-1:

TABLE 4-1

FLOATING CONE INPUT PARAMETERS

Mining cost on 5160 bench	$0.7410/t material mined
Add for each bench below 5160	$0.0062/t material mined
Subtract for each bench above 5160	$0.0062/t material mined
Process cost - Flotation	$4.82/t ore processed
- Heap Leach	$3.90/t ore processed
Refining cost	$1.50/recovered ounce
Waste disposal cost	$0.035/t waste dumped
% Recoveries - Sulfide	81.8 - .491/g
- Oxide to 0.07 oz/t	45.7 + 433g
- Oxide over 0.07 oz/t	90 - 200g
- Mixed to 0.07 oz/t	66 + 205.7g - 0.491/g
- Mixed over 0.07 oz/t	81.6 - 95g - 0.491/g
(g = gold grade in oz/ton)	
Refining recovery	100%
Severance tax	2%
Pit slope angles	43-47 degrees overall
Gold prices	225, 250, 300, 350, 375, 400, 450, 500 $/ounce
Topographic surface	As at end oxide pit

It should be noted that final flotation process costs are slightly lower (at $4.68/ton) and final flotation recoveries slightly higher than shown above. However, since the $400 cone reserves did not vary appreciably when these new numbers were input (see Table 4.2), it was not deemed necessary to rerun the complete suite of cones to reflect final costs and recoveries.

The sources of data used to prepare Table 4-1 were:

Mining costs and gold price range - IMC
Process costs, flotation recoveries, waste disposal cost - Roberts & Schaefer
Oxide recoveries, pit slope angles, topography - Gilt Edge Mine staff.

Mixed ore recoveries were established by assuming that 50% of the mixed ore was "high sulfide" and would be sent to the flotation circuit, and that the remaining 50% of the mixed ore was "low sulfide" and would be sent to the leach pad. Because of the mixture of oxide and sulfide material, however, it was assumed that overall recoveries would only be 95% of the recoveries for "pure" sulfide or oxide ore.

The tonnages, grades, contained gold ounces and stripping ratios obtained for the floating cone pits at the different gold prices used are summarized in Table 4-2. A more complete summary which subdivides reserves by ore type is given Table 4-3.

TABLE 4-2

SUMMARY OF RESULTS OF FLOATING CONE RUNS

Gold price ($/oz)	Total Ore		Thousand oz. gold contained	Waste Ktons	Strip Ratio
	Ktons	oz/t			
200	2000	0.054	110	2000	1.0:1
225	14284	0.044	630	27137	1.9:1
250	15033	0.046	690	29341	2.0:1
300	22072	0.044	970	44662	2.0:1
350	28082	0.042	1180	65723	2.3:1
375	43139	0.041	1770	125493	2.9:1
400	48820	0.041	2000	151931	3.1:1
400*	50420	0.040	2020	159547	3.2:1
450	52581	0.040	2100	166916	3.2:1
500	58326	0.039	2270	204150	3.5:1

TABLE 4-3

FLOATING CONE RESERVES BY ORE TYPE

Cone Price ($)	Sulfide Ore KTons	Sulfide Ore oz/t	Mixed Ore KTons	Mixed Ore oz/t	Oxide Ore Ktons	Oxide Ore oz/t	Total Ore KTons	Total Ore oz/t	Waste KTons
225	11391	.047	1674	.029	1219	.042	14284	.044	27137
250	12038	.047	1722	.045	1273	.042	15033	.046	29341
300	17952	.045	2193	.042	1927	.039	22072	.044	44662
350	23154	.043	2473	.041	2455	.038	28082	.042	65723
375	35820	.041	2912	.040	4407	.038	43139	.041	125493
400	40809	.041	3146	.039	4865	.038	48820	.041	151931
400*	42358	.040	3168	.039	4894	.038	50420	.040	159547
450	44388	.040	3270	.039	4923	.038	52581	.040	166916
500	48648	.039	3681	.039	5997	.038	58326	.039	204150

The $400 cone was rerun using the final flotation costs and recoveries discussed earlier in this section in order to derive the "400*" case shown on Tables 4-2 and 4-3. It can be seen that the impact of the cost and recovery changes on reserves, grade, contained ounces and stripping ratio is not significant. Reserves for the $200 cone are approximate and are listed for comparison purposes only.

The reserves shown on Tables 4-2 and 4-3 are quoted above a 0.022 oz/ton internal cutoff grade. Table 4-4 summarizes cutoff grades for Gilt Edge ore at the input costs listed in Table 4-1 (mining costs are 5160 bench costs):

TABLE 4-4

GILT EDGE ORE CUTOFF GRADES (OZ/TON)

Ore type	Breakeven COG	Internal COG
Sulfide	0.024	0.022
Mixed to mill	0.025	0.023
Mixed to leach	0.023	0.020
Oxide to leach	0.022	0.019

The breakeven cutoff grade is the grade at which ore in the ground pays the cost of mining and processing. The internal cutoff grade ignores mining costs, and reflects the grade at which material brought to the pit rim pays for the cost of processing.

The floating cone runs show that ore grades decline only slightly as ore tonnage increases. This indicates that the cones are being constrained by the stripping ratio rather than by the grade of the ore, and that each increase in the gold price adds ore tons by paying for more stripping rather than by incorporating lower-grade reserves.

Figures 4-1 through 4-4 show the outlines and locations of the cone pits run at gold prices of $225, $300, $400 and $500/oz. The $225 pit is the first pit that "floats" to any significant depth, and it takes in the shallower portions of the Dakota Maid and Sunday orebodies. The $300 pit is effectively an enlargement of the $225 pit. At $400 gold, the cone expands to the east to take in the deep reserves in the Hoodoo area. The $500 pit is only slightly bigger than the $400 pit. Table 4-2 confirms that gold price increases in the $400 to $500 range do not generate any major additions to mineable reserves at least in the immediate area of the proposed sulfide pit.

At the client's request, the $400 cone pit has been used as the basis for defining the outline of the Phase 3 (ultimate) pit, and to determine final mineable reserves. The "satellite" cone pits off to the side of the main pit do not generally reflect mineable shapes and are neglected in mine planning. However, the ore and waste material contained in these pits are included in Tables 4-2 and 4-3.

4.2 Phased Pit Designs:

The floating cone results were used to develop phased pit designs for the Gilt Edge sulfide orebody. The basic criteria used to develop the phase designs were:

1. Provide a constant ore supply to the mill
2. Minimize fluctuations in total material movement.
3. Ensure haul road access to and from the working benches.
4. Ensure adequate working room for mining equipment.

The $400 floating cone pit was used as the basis for designing the ultimate pit. Two intermediate phased pits, which correlated roughly with the $250 and $300/$350 cone pits, were developed inside the ultimate pit limit. The specific constraints and parameters used to design the phased pits were:

* Maximum haul road grade 10 percent.
* Haul road width 80ft.
* Minimum acceptable pushback width 200ft, with a nominal local minimum of 80ft being acceptable.
* Maximum interramp slope angle 53 degrees (assuming triple-benching)
* Maximum interramp slope angle 45 degrees in the foliated Precambrian rocks in the northeast pit wall.

It should be noted that the viability of the phased pit designs is contingent on the accuracy of the assumptions made regarding pit slope angles. Pit slope angles have been supplied to IMC by Brohm Mining Corporation, and while IMC believes the data to be reasonable, a full evaluation of pit slope stability was not included in IMC's scope of work.

The limits of the ultimate phased pit were adjusted so as to achieve the maximum net economic benefit (expressed on an undiscounted, before-tax basis) over the life of the mine, and to ensure that no significant tonnage of ore that would be mineable at a $400 gold price was left in the ground. The limits of the intermediate phase 1 and phase 2 pits were then established. Basic data for the three phases are summarized on Table 4-5:

TABLE 4-5

SUMMARY OF MINING PHASES

Phase	KTons Ore	Grade oz/t	KTons Waste	Strip Ratio
1	13,254	.043	27,149	2.0:1
2	12,500	.040	38,258	3.1:1
3	20,050	.038	71,214	3.6:1
TOTALS	45,804	.040	136,621	3.0:1

The tonnage and grade figures represent combined values for all ore types above a 0.022 oz/ton cutoff. The detailed annual production schedules are discussed in Section 4.5.

The phased pit designs provided the basis for the development of the annual pit plans and production schedules described in Sections 4.4 and 4.5 below. The reserves contained within the phased pits themselves are not meaningful because they are not related to any specific time period, and because they do not take prestripping into account.

4.3 Mine Plan Optimization Studies:

4.3.1 **Varying Cutoff Grades:**

Before the phases were converted into annual pit plans and final production schedules, attempts were made to optimize the value of the mining operation through cutoff grade policy revisions and discounted analysis.

An analysis of the NPV impacts of varying the ore cutoff grade is summarized on Table 4-6. It should be noted that this analysis addresses only the mining side of the operation, and that process plant and ancillary capital and operating costs are ignored. It should also be noted that a $400 sales price for gold produced is assumed in all cases.

TABLE 4-6

NPV IMPACTS OF CHANGING CUTOFF GRADE

Year	Cutoff Grade (oz/ton)		
	Base Case	Flat .025	Declining
0	0.022	0.025	0.030
1	0.022	0.025	0.030
2	0.022	0.025	0.030
3 on	0.022	0.025	0.025

	NPV ($mm) @ disc. rate				
Cutoff Grade Case:	5	7	10	15	18
Base, no mine capital	102	92	79	62	54
Flat .025, no mine capital	103	94	82	66	59
Declining, no mine capital	102	94	84	70	63
Base, inc mine capital	80	70	58	42	34
Flat .025, inc mine capital	77	68	57	42	35
Declining, inc mine capital	75	67	57	44	38

The cash flows used to calculate these NPVs were derived from a preliminary annual production schedule and from Table 4-1 mining costs. Mine capital requirements were calculated assuming that the mine capital, in dollars, was equivalent to the maximum total material movement in any year, in tons. The ore production rate was assumed to be constant at 12,500 tpd (4.56 million tpy).

The results of the analysis show only minor variations between the cases. With mine capital included, NPVs are higher for the flat .025 and declining cutoff grade cases at discount rates of 15% and above, but at discount rates of 10% or below, NPVs are higher for the base case.

In addition, the base case produces more ounces of gold, requires less mine capital, and gives a longer mine life than the .025 case or the declining case (the figures are 1.21, 1.12 and 1.08 million ounces, $22.7, 26.8 and 29.5 million, and 9.3, 7.8 and 7.2 years respectively). It is unlikely that the attractiveness of the .025 or declining options could be improved significantly by stockpiling low grade ore for processing at the end of the mine life.

The conclusion is that the economics of mining at Gilt Edge, expressed on a discounted basis, are not very sensitive to cutoff grade policy, and that using a flat 0.022 oz/ton internal cutoff through the mine life constitutes a reasonable cutoff grade policy. It is somewhat unusual for a gold mine to mine at the internal cutoff grade in the first year of operation (the cutoff grade during preproduction has been raised to 0.025 oz/ton), but at Gilt Edge there does not appear to be any significant benefit in using a higher cutoff grade during the early years of mining activity.

4.3.2 Economic Viability of Phase 3:

Further discounted analysis was conducted in order to evaluate the incremental returns from the phase 3 pit, which is based upon a higher floating cone gold price than the intermediate phased pits, and which may therefore be considered to be the least robust of the phases. This analysis was conducted by eliminating phase 3 from the mining operation and by calculating NPVs for phase 1 and phase 2 only, using the same range of cases and discount factors that were used to prepare Table 4-6.

The results are tabulated in Table 4-7. It can be seen that the NPV of the mining operation decreased in all cases when Phase 3 was eliminated, indicating that Phase 3 is robust over a range of cutoff grade and discount rate scenarios at the assumed $400 gold price. The phase can be expected to be less robust at lower gold prices, but a quantitative evaluation of the impacts of reducing the gold price was not conducted.

TABLE 4-7

NPVs OF MINING OPERATION WITHOUT PHASE 3

	NPV ($mm) @ disc. rate				
Cutoff Grade Case:	5	7	10	15	18
Base, no mine capital	82	76	69	59	53
Flat .025, no mine capital	81	76	69	60	55
Declining, no mine capital	79	75	69	61	57
Base, inc mine capital	62	56	49	40	35
Flat .025, inc mine capital	58	54	47	39	34
Declining, inc mine capital	51	48	43	35	32

These NPVs were calculated using the same 12,500 tpd throughput rate as was assumed for the full mining operation, and they are consequently discounted over a much shorter mine life. If ore throughput rate was matched to ore tonnage in order to maintain an 8 to 10 year mine life, it is likely that the NPVs would decrease. The overall profitability of the operation would also decrease as a result of higher per-ton process capital and operating costs.

4.3.3 **Vary Mineable Reserves and Ore Throughput Rate:**

An approximate analysis was performed in order to evaluate the sensitivity of Gilt Edge production costs to changes in mineable reserves and ore throughput rate. The assumptions used were:

* The analysis was performed on a cash basis without discounting.

* The results of the floating cone analyses shown in Table 4-2 were used as the basis for varying mineable reserves, and throughput rates were calculated assuming an eight-year reserve life.

* Operating costs were as shown in Table 4-1. Mine capital and process plant capital costs were $32.4 million and $67.6 million respectively. These costs related to a process plant throughput rate of 12,500 tpd and to a maximum mining rate of 26.3 million tpy.

* The exponential scale factors used to calculate costs at different throughput rates are 0.9 for mine operating and mine capital costs, 0.6 for process plant capital cost, and 0.48 for process plant operating cost.

The estimated cash costs of producing an ounce of gold as a function of mineable tonnage and throughput rate are summarized in Table 4-8. It can be seen that production costs are lowest at the 12,400 and 13,800 tpd throughput rates, and that they are quite insensitive to increases in throughput rate above 13,800 tpd.

TABLE 4-8

PRODUCTION COSTS AS A FUNCTION OF THROUGHPUT RATE

Floating Cone $	Ktons ore	Strip Ratio	Throughput Rate (tpd)	Production Costs/oz: With depr	W/O depr
225	9,700	1.8:1	3,500	475	370
250	16,700	2.2:1	6,000	390	300
300	20,300	2.4:1	7,200	375	285
350	25,500	2.7:1	9,100	360	275
375	34,800	3.3:1	12,400	350	265
400	38,700	3.6:1	13,800	350	265
450	42,200	3.8:1	15,100	355	270
500	44,900	4.0:1	16,000	355	270

4.3.4 Relocate Existing Leach Pad:

Approximately 3.5 million tons of heap-leachable oxide and mixed ore will be produced from the Gilt Edge sulfide pit. However, the sulfide pit will excavate a portion of the existing leach pad plus the pregnant solution surge pond early in the mine life. This will require that the leach facilities be rebuilt or relocated if heap leaching is to continue.

Floating cone analysis was first used to determine whether any benefit would be realized by not extending the sulfide pit into the leach pad area. It was found that while preserving the leach pad would save approximately $1 million in estimated relocation costs, approximately 10 million tons of mineable ore with a pretax value (net of mining and processing costs) of $30 million would be lost.

Further studies were then conducted to measure the profitability of the leaching operation as a function of time, and to determine what the optimum economic life of the heap leach operation might be. The results of this analysis are summarized on Table 4-9.

TABLE 4-9

PROFITABILITY OF LEACHING OPERATION WITH TIME

Year	Ore (Ktons)	Grade (oz/ton)	Rec Au (ozs)	Net Profit ($000)	Cumulative Profit ($000)
Prep	531	.043	1,492	348	348
1	872	.038	1,938	378	726
2	787	.037	1,659	301	1,026
3	292	.049	852	207	1,234
4	446	.041	1,165	261	1,495
5	282	.036	528	107	1,601
6	122	.039	268	53	1,654
7	47	.034	88	14	1,668
8	65	.033	123	20	1,688
9	35	.030	58	8	1,696
10	29	.031	50	7	1,703

As a result of these profitability analyses, it was determined that the heap leach operation should be discontinued at the end of year 2, when the additional profit potential from continued leaching no longer justifies the cost of relocating the leach facilities. At this point, the pit can be allowed to mine into the leach pad and the surge pond.

4.4 Construction Schedule

Figure 4-5 illustrates the Gilt Edge construction schedule that has been supplied by Roberts & Schaefer. The mine production schedule dovetails with the construction schedule, but the mine production schedule relates to the startup of mining operations while the construction schedule relates to calendar years.

Sepcifically, the mine preproduction period extends from August of Year -2 through April of Year 1 of the construction schedule. The duration of preproduction is 1.75 years (the construction schedule does not have a year 0). Following startup, all mine schedule years run from May 1 through April 30 of the next year, except for Year 10, which is only about six months long.

4.5 Mine Production Schedules:

Annual production schedules for the sulfide pit have been derived from the phased pit geometries discussed in Section 4.2. These production schedules have been adjusted in order to achieve a constant supply of sulfide ore to the mill, to smooth out the waste mining rate so as to eliminate peaks in total material movement, and to allow for rehandling and processing of sulfide ore stockpiles that remain at the end of oxide mining.

Production schedules have been developed for sulfide, oxide and mixed ore using the following criteria:

1. The sulfide mill will treat ore at the rate of 12,500 tpd (4,562,000 tpy). This feed requirement will be met by sending all of the sulfide ore mined, plus 50% of the mixed ore mined (the higher-sulfide fraction) to the sulfide mill. Some 725,000 tons of sulfide ore stockpiled during the oxide mining phase will be available as mill feed ore in Year 1.

2. The existing heap leach pad will treat all of the oxide ore mined, plus the 50% of the mixed ore that is not sent to the mill. There is no design throughput rate requirement.

3. As discussed in Section 4.3.4 above, heap leach operations will be shut down at the end of year 2. At this point, the pit will be allowed to expand into the leach facilities, and all of the oxide and 50% of the mixed ore remaining (a total of approximately 1.3 million tons) will be reclassified as waste.

4. Waste rock production schedules must take construction fill requirements, waste categorization and dumping methods into account. Waste rock production, disposal criteria and schedules are addressed in detail in Section 5.

Annual ore and waste rock production from the Gilt Edge sulfide pit is summarized in Table 4-10:

TABLE 4-10

SUMMARY OF GILT EDGE ORE & WASTE PRODUCTION

Year	---Mill Ore---- Ktons	Grade Oz/ton	----Leach Ore---- Ktons	Grade Oz/ton	Waste Ktons
Prep			457	.0435	9,350
1	4,562	.0397	816	.0388	13,500
2	4,562	.0413	862	.0356	17,353
3	4,562	.0449			18,137
4	4,562	.0416			18,138
5	4,562	.0391			18,141
6	4,562	.0390			18,147
7	4,562	.0360			11,236
8	4,562	.0369			5,993
9	4,652	.0419			5,609
10	1,953	.0403			2,395
TOTALS	43,011	.0401	2,135	.0385	137,999

Note 1: Ore sent to the mill in Year 1 includes sulfide stockpile ore.

Note 2: After the leach pad is decommissioned in Year 2, all of the oxide ore and half of the mixed ore mined is reclassified as waste.

Mill and leach ore cutoffs are 0.022 oz/ton for years 1 to 10 and 0.025 oz/ton during preproduction. The 0.022 oz/ton cutoff, which is the internal cutoff grade for sulfide ore (see Table 4-4), has been applied to all ore types for convenience and simplicity. The use of slightly different cutoff grades for the comparatively small tonnages of mixed and oxide ore to be mined makes no significant difference to the production schedule.

The production schedule limits total material movement during preproduction to about 10 million tons, and limits the maximum amount of material moved in any one year to 22.7 million tons. The highest stripping ratio in any year is 4.0:1, compared to a mine-life average of 3.1:1.

The data supplied in Table 4-10 do not take movements of stockpile ore into account. Tables 4-11 and 4-12 respectively summarize mill ore and leach ore allocation by year allowing for movements of stockpiled material. One 75,000-ton mill ore ROM stockpile will be maintained through the mine life, and a 75,000-ton ROM leach ore stockpile will be maintained through the life of the leaching operation.

Table 4-13 breaks down ore and waste production by year, phase and bench. So that the information is available should it be needed, this table breaks out the oxide and mixed ore that is mined after leach pad shutdown at the end of Year 2, which elsewhere in this report is classified as waste.

4.6 Annual Mine Plans:

Annual mine plans have been developed for the end of the preproduction period, and for the end of Years 1, 2, 3, 5, 8 and 10. These plans have been produced at 1" = 200' as Figures 4-7 through 4-13, and are available under separate cover. These figures show the locations of major mine facilities, including the oxide and sulfide crushers and stockpiles. Figure 4-6 shows topography at the end of the oxide pit, which forms the initial topography at the beginning of the sulfide pit operation.

Final waste dump plans are provided and discussed in Section 5.

FIGURE 4-1

Floating Cone Analysis
Gold Price $225

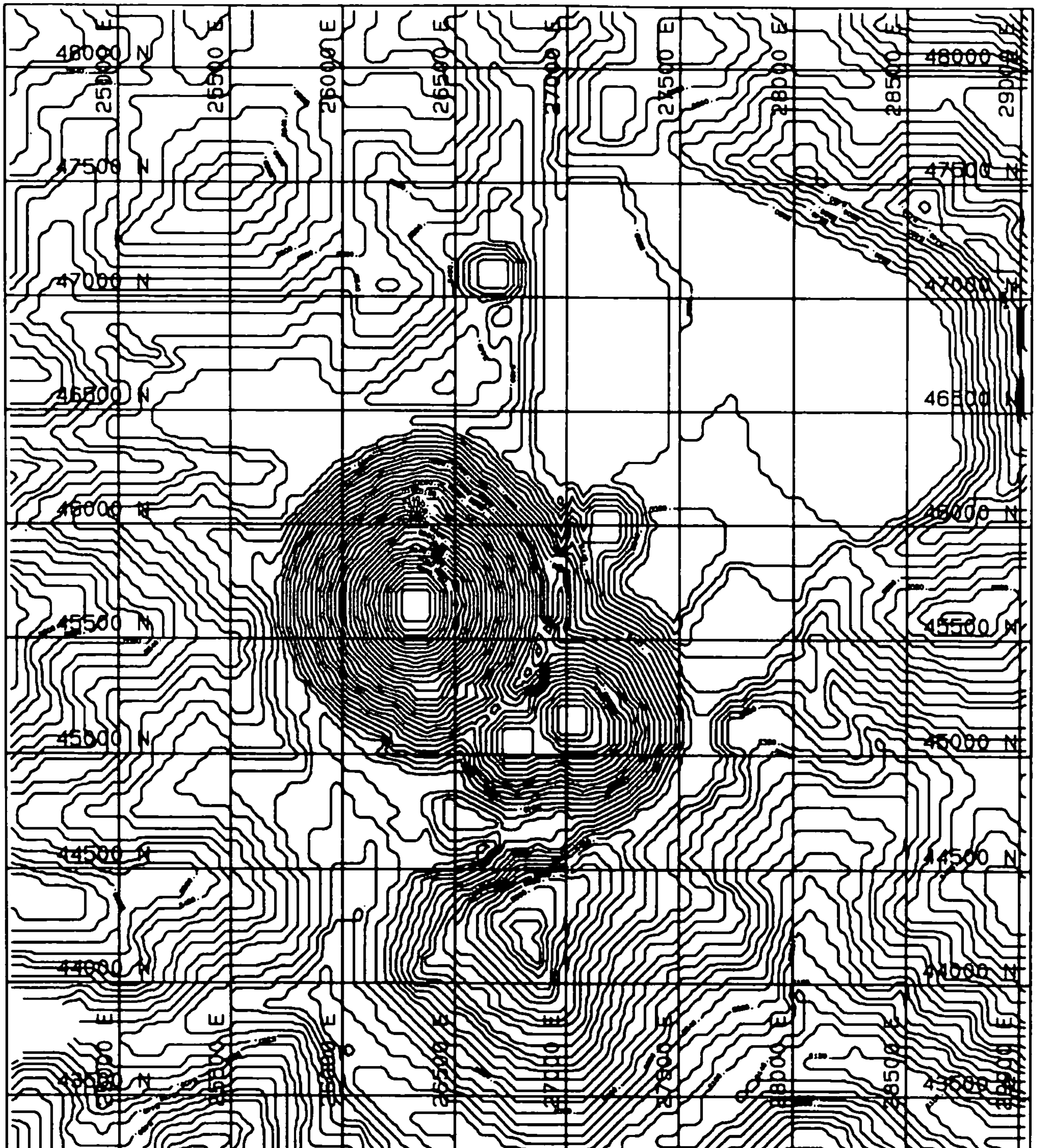
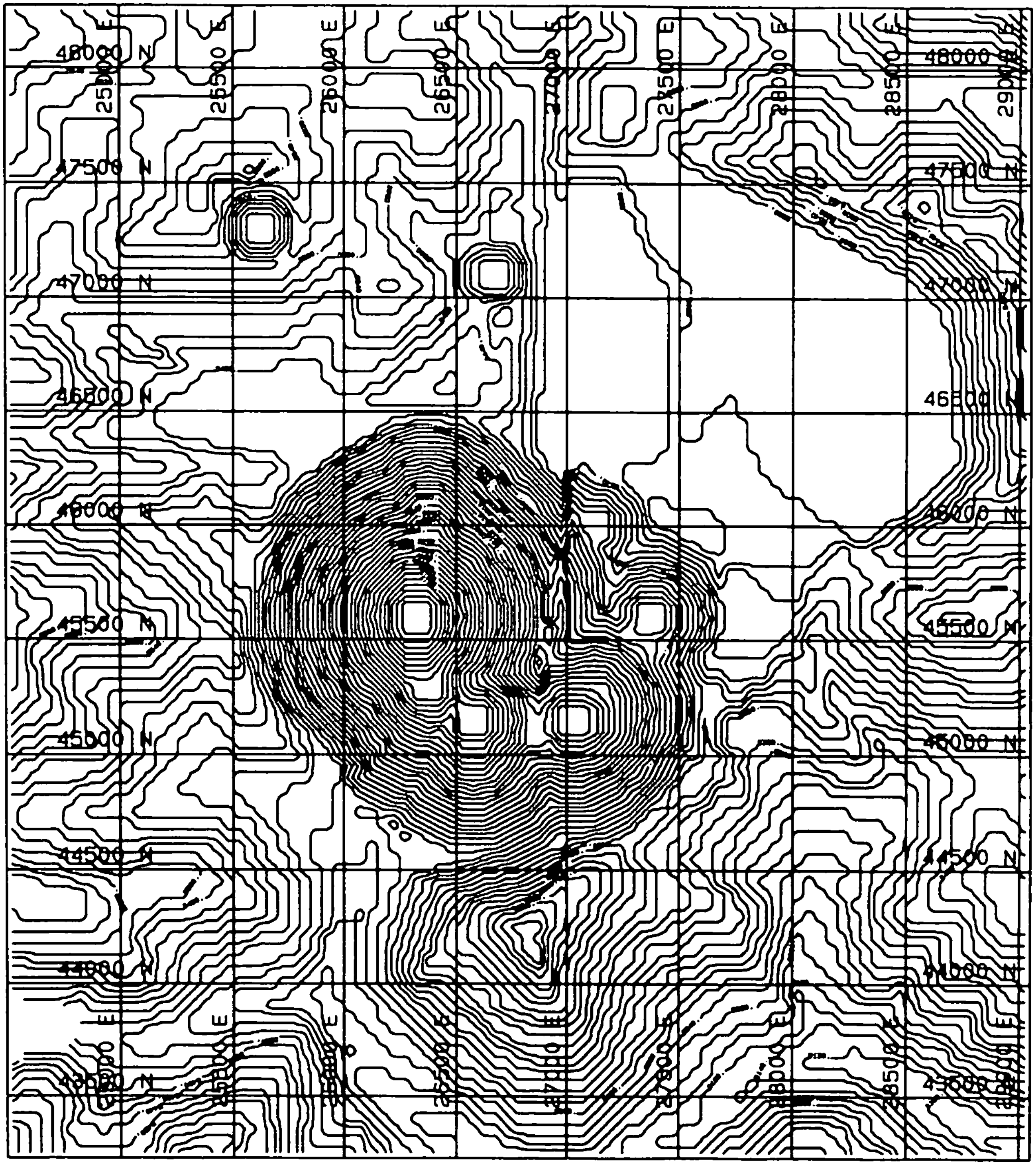


FIGURE 4-2

Floating Cone Analysis
Gold Price $300



INDEPENDENT
MINING CONSULTANTS, INC.

FIGURE 4-3

Floating Cone Analysis

Gold Price $400

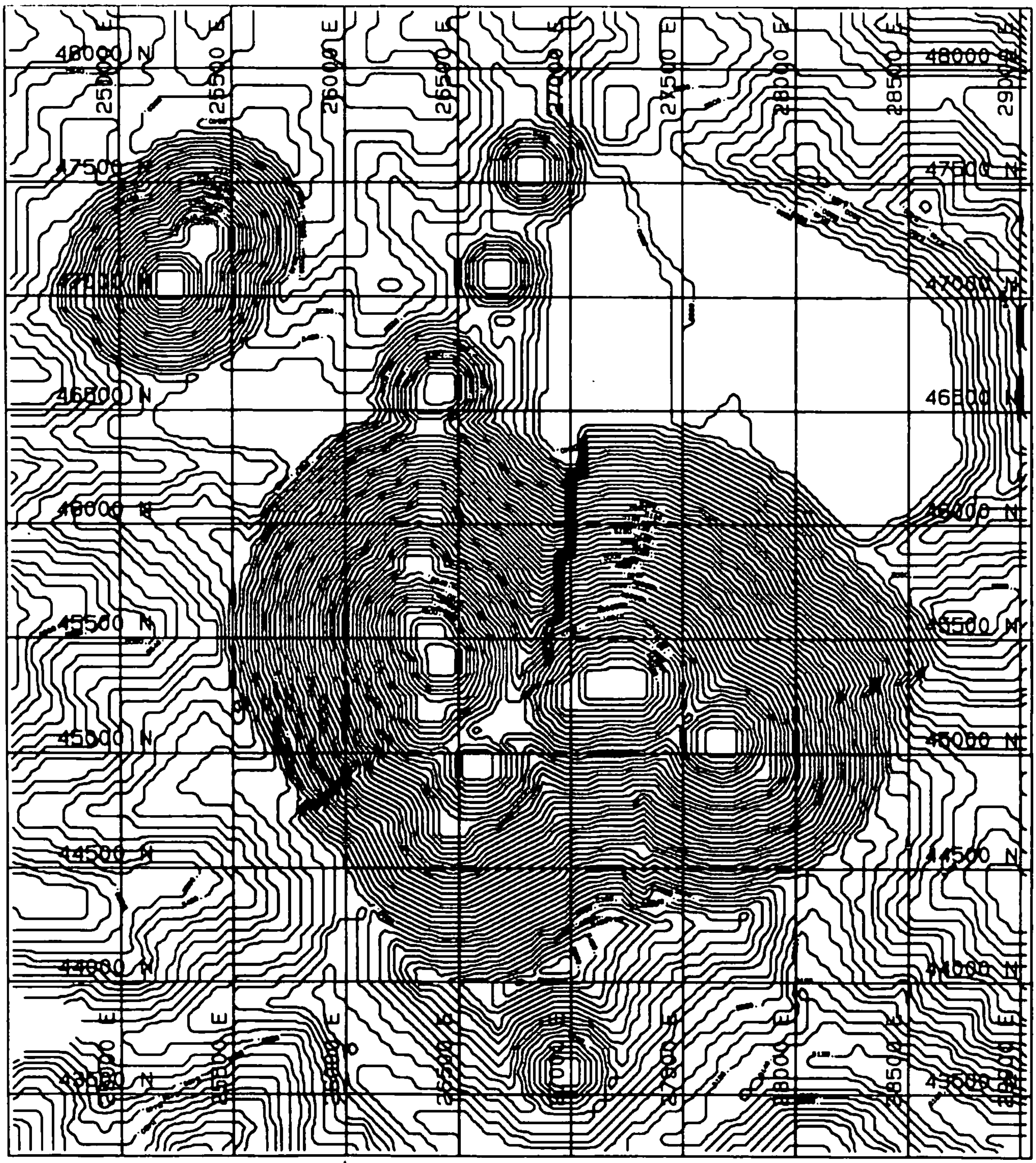
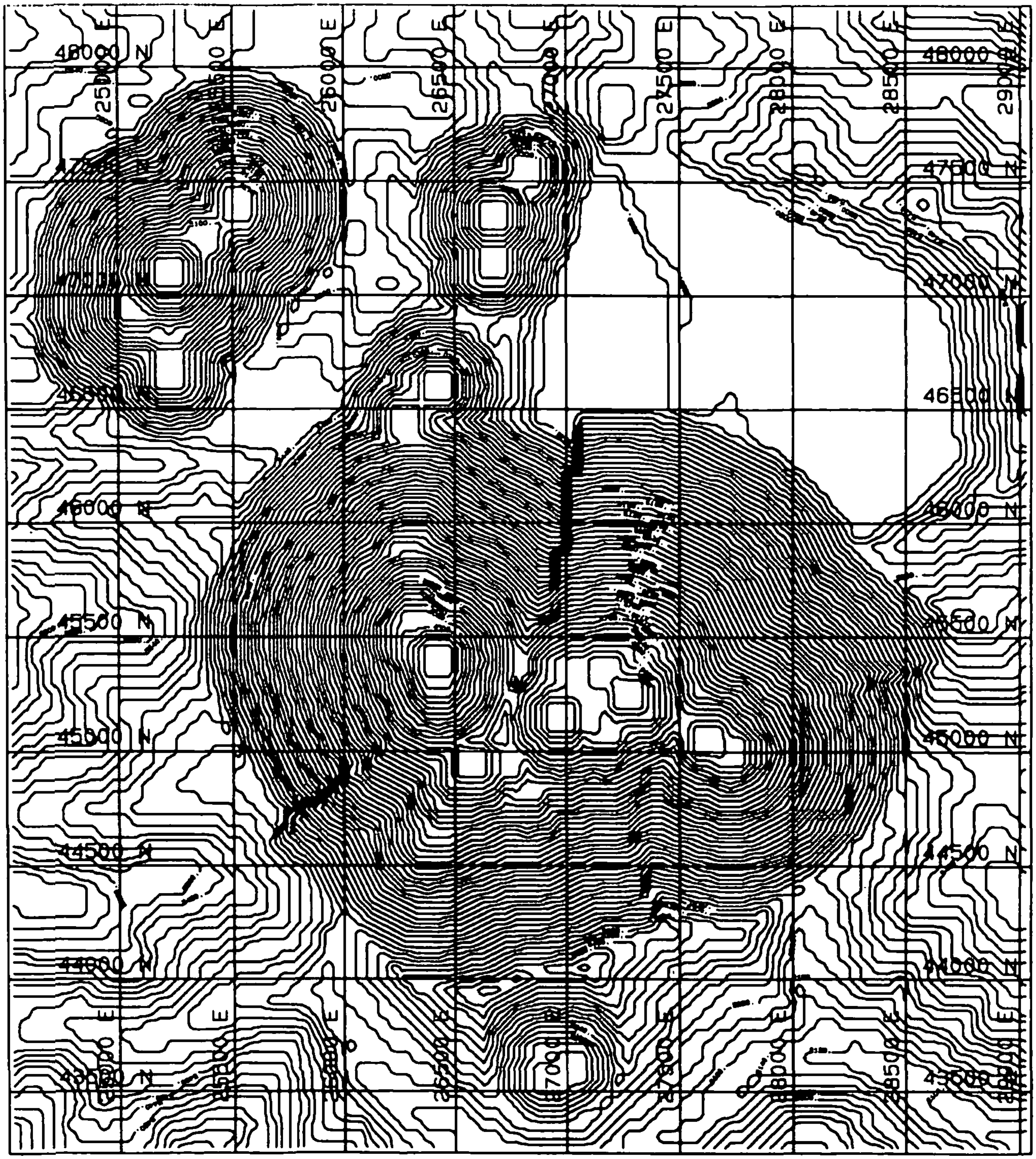


FIGURE 4-4

Floating Cone Analysis
Gold Price $500



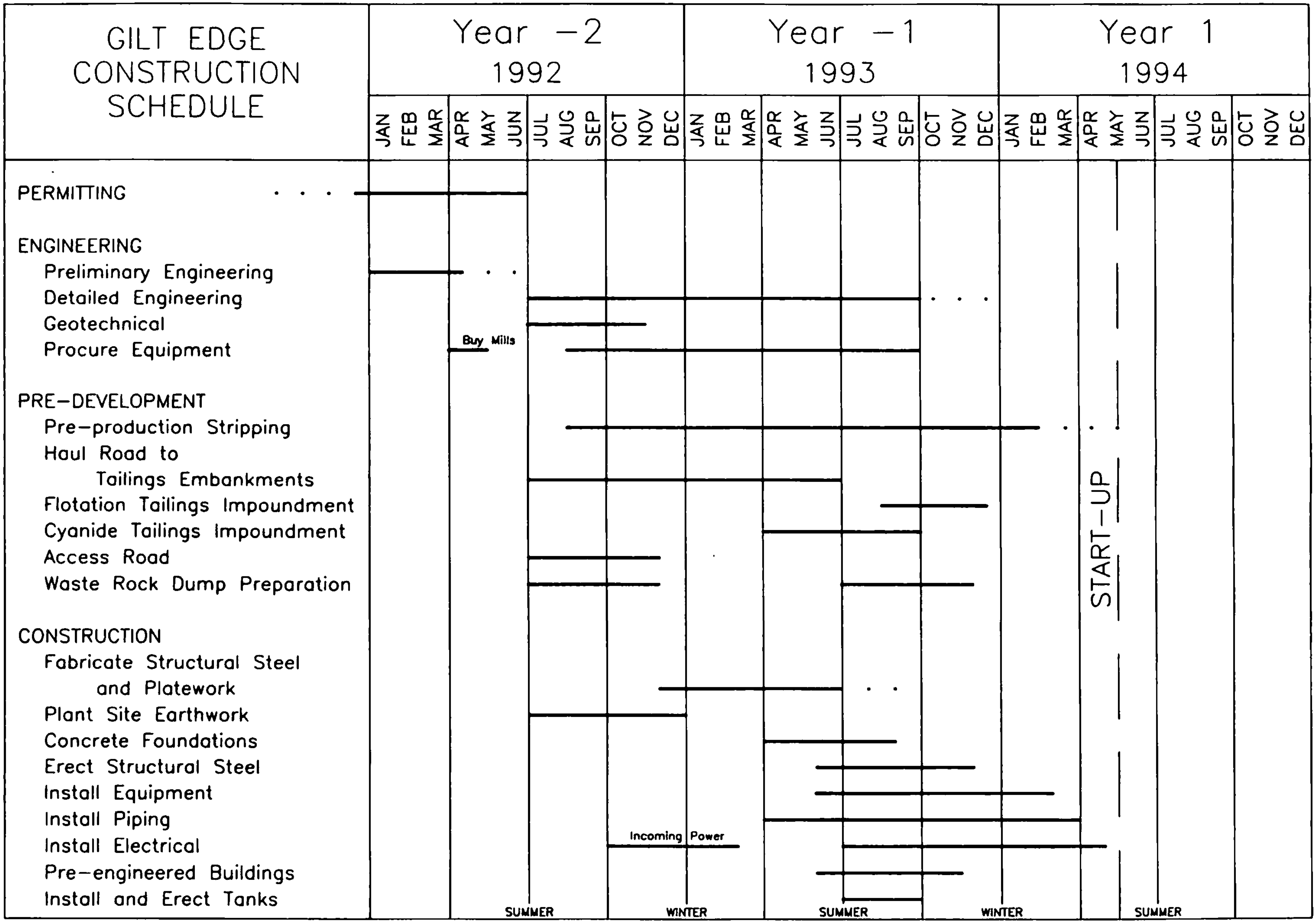

GILT EDGE CONSTRUCTION SCHEDULE
Year -2
1992
Year -1
1993
Year 1
1994
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
PERMITTING
ENGINEERING
Preliminary Engineering
Detailed Engineering
Geotechnical
Procure Equipment
Buy Mills
PRE-DEVELOPMENT
Pre-production Stripping
Haul Road to Tailings Embankments
Flotation Tailings Impoundment
Cyanide Tailings Impoundment
Access Road
Waste Rock Dump Preparation
CONSTRUCTION
Fabricate Structural Steel and Platework
Plant Site Earthwork
Concrete Foundations
Erect Structural Steel
Install Equipment
Install Piping
Install Electrical
Incoming Power
Pre-engineered Buildings
Install and Erect Tanks
START-UP
SUMMER
WINTER
SUMMER
WINTER
SUMMER

Figure 4-5

Table 4-11

Brohm Gilt Edge Project

SUMMARY OF MILL ORE ALLOCATION

	PREP		YR 1		YR 2		YR 3		YR 4		YR 5	
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T
SULFIDE ORE												
Source:												
Mine Ore	43	0.0316	3416	0.0380	4360	0.0413	4391	0.0446	4401	0.0417	4406	0.0392
Pre-Mine Stockpile	0		725	0.0480	0		0		0		0	
Mill Stockpile	0		43	0.0316	75	0.0380	75	0.0413	75	0.0446	75	0.0417
Destination:												
Mill Plant	0		4109	0.0397	4360	0.0412	4391	0.0445	4401	0.0417	4406	0.0392
Pre-Mine Stockpile	0		0		0		0		0		0	
Balance	725	0.0480	0		0		0		0		0	
Mill Stockpile	43	0.0316	75	0.0380	75	0.0413	75	0.0446	75	0.0417	75	0.0392
Balance	43	0.0316	75	0.0380	75	0.0413	75	0.0446	75	0.0417	75	0.0392
MIXED ORE												
Source:												
1/2 Mine Ore	32.5	0.0366	420.5	0.0395	202	0.0414	171	0.0532	161	0.0379	156	0.0363
Mill Stockpile	0		32.5	0.0366	0		0		0		0	
Destination:												
Mill Plant	0		453	0.0393	202	0.0414	171	0.0532	161	0.0379	156	0.0363
Mill Stockpile	32.5	0.0366	0		0		0		0		0	
Balance												
TOTAL MILLED	0		4562	0.0397	4562	0.0413	4562	0.0449	4562	0.0416	4562	0.0391

The initial stockpile conditions are:
  Pre-Mine Stockpile - 725 ktons of sulfide ore at average grade of 0.0480 oz/ton.
  (the sulfide ore from August 1990 to End of Oxide Pit at a 0.025 oz/ton cutoff)
  Mill Stockpile - empty.

The existing leach facility is operated through end of year 2.
During years 3 through 10, all oxide and half the mixed ore
becomes nonsulfide waste.

Table 4-11 Continued

Brohm Gilt Edge Project
SUMMARY OF MILL ORE ALLOCATION

	YR 6		YR 7		YR 8		YR 9		YR 10		TOTAL	
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T
SULFIDE ORE												
Source:												
Mine Ore	4447	0.0390	4518	0.0360	4521	0.0370	4536	0.0421	1859	0.0403	40898	0.0399
Pre-Mine Stockpile	0		0		0		0		0			
Mill Stockpile	75	0.0392	75	0.0390	75	0.0360	75	0.0370	75	0.0421		
Destination:												
Mill Plant	4447	0.0390	4518	0.0360	4521	0.0370	4536	0.0420	1934	0.0404	41623	0.0401
Pre-Mine Stockpile	0		0		0		0		0			
Balance	0		0		0		0		0			
Mill Stockpile	75	0.0390	75	0.0360	75	0.0370	75	0.0421	0			
Balance	75	0.0390	75	0.0360	75	0.0370	75	0.0421	0			
MIXED ORE												
Source:												
1/2 Mine Ore	115	0.0393	44	0.0340	41	0.0332	26	0.0283	19	0.0291	1388	0.0401
Mill Stockpile	0		0		0		0		0			
Destination:												
Mill Plant	115	0.0393	44	0.0340	41	0.0332	26	0.0283	19	0.0291	1388	0.0401
Mill Stockpile	0		0		0		0		0			
Balance												
TOTAL MILLED	4562	0.0390	4562	0.0360	4562	0.0369	4562	0.0419	1953	0.0403	43011	0.0401

Table 4-12

Brohm Gilt Edge Project

SUMMARY OF LEACH ORE ALLOCATION

	PREP		YR 1		YR 2		TOTAL	
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T
OXIDE ORE								
Source:								
Mine Ore	499	0.0440	396	0.0366	585	0.0335	1480	0.0379
Leach Stockpile	0		75	0.0440	75	0.0366		
Destination:								
Leach Plant	424	0.0440	396	0.0380	660	0.0339	1480	0.0379
Leach Stockpile	75	0.0440	75	0.0366	0			
Stockpile Balance	75	0.0440	75	0.0366	0			
MIXED ORE								
Source:								
1/2 Mine Ore	32.5	0.0366	420.5	0.0395	202	0.0414	655	0.0399
Leach Stockpile	0		0		0			
Destination:								
Leach Plant	32.5	0.0366	420.5	0.0395	202	0.0414	655	0.0399
Leach Stockpile	0		0		0			
TOTAL LEACHED	456.5	0.0435	816.5	0.0388	862	0.0356	2135	0.0385

Note: Existing leach facility operated through the end of year 2. During years 3 through 10, all oxide and half the mixed ore becomes nonsulfide waste.

Table 4-13

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - PREPRODUCTION
Cutoff Grade (oz/ton): 0.025

	SULFIDE ORE		MIXED ORE		OXIDE ORE		WASTE	TOTAL
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	KTONS
PHASE 1								
5620	0	0.000	0	0.000	1	0.045	7	8
5600	0	0.000	0	0.000	25	0.057	167	192
5580	0	0.000	0	0.000	25	0.054	303	328
5560	0	0.000	0	0.000	29	0.052	405	434
5540	0	0.000	0	0.000	46	0.044	452	498
5520	0	0.000	0	0.000	51	0.048	568	619
5500	0	0.000	0	0.000	49	0.051	602	651
5480	0	0.000	4	0.031	44	0.049	645	693
5460	0	0.000	9	0.049	52	0.038	765	826
5440	1	0.047	7	0.031	30	0.041	838	876
5420	26	0.033	28	0.041	23	0.028	905	982
SUBTOTAL	27	0.034	48	0.040	375	0.046	5657	6107
PHASE 2								
5640	0	0.000	0	0.000	0	0.000	10	10
5620	0	0.000	0	0.000	0	0.000	50	50
5600	0	0.000	0	0.000	0	0.000	92	92
5580	0	0.000	0	0.000	0	0.000	312	312
5560	0	0.000	0	0.000	8	0.038	445	453
5540	4	0.027	0	0.000	19	0.037	517	540
5520	4	0.028	0	0.000	26	0.036	629	659
5500	4	0.029	3	0.026	35	0.039	772	814
5480	4	0.030	14	0.027	36	0.038	866	920
SUBTOTAL	16	0.029	17	0.027	124	0.038	3693	3850
TOTAL	43	0.032	65	0.037	499	0.044	9350	9957

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 1
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 1								
5400	109	0.038	89	0.037	20	0.028	1037	1255
5380	175	0.041	86	0.036	40	0.035	1141	1442
5360	250	0.042	78	0.037	28	0.029	1240	1596
5340	357	0.041	105	0.038	47	0.035	1528	2037
5320	437	0.038	120	0.038	49	0.033	1659	2265
5300	514	0.037	103	0.039	40	0.039	1699	2356
5280	584	0.036	112	0.043	55	0.044	1577	2328
5260	640	0.037	86	0.049	44	0.040	1442	2212
5240	321	0.038	39	0.044	15	0.041	615	990
SUBTOTAL	3387	0.038	818	0.040	338	0.037	11938	16481
PHASE 2								
5460	12	0.030	16	0.028	45	0.038	992	1065
5440	17	0.026	7	0.026	13	0.033	570	607
SUBTOTAL	29	0.028	23	0.027	58	0.037	1562	1672
TOTAL	3416	0.038	841	0.039	396	0.037	13500	18153

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 2
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 1								
5240	347	0.038	39	0.044	16	0.041	665	1067
5220	652	0.041	55	0.041	31	0.044	1184	1922
5200	653	0.040	47	0.038	23	0.049	1059	1782
5180	606	0.042	49	0.044	11	0.045	988	1654
5160	612	0.044	35	0.053	8	0.055	867	1522
5140	620	0.048	23	0.062	8	0.041	736	1387
5120	240	0.050	11	0.069	2	0.035	264	517
SUBTOTAL	3730	0.043	259	0.046	99	0.045	5763	9851
PHASE 2								
5440	16	0.026	8	0.026	12	0.033	542	578
5420	58	0.029	11	0.028	54	0.027	1162	1285
5400	75	0.033	5	0.018	65	0.029	1234	1379
5380	64	0.037	7	0.023	73	0.032	1302	1446
5360	71	0.033	11	0.029	95	0.034	1367	1544
5340	91	0.031	22	0.032	89	0.035	1387	1589
5320	101	0.033	33	0.033	81	0.028	1469	1684
5300	80	0.030	30	0.030	10	0.024	1646	1766
5280	74	0.028	18	0.056	7	0.020	1481	1580
SUBTOTAL	630	0.032	145	0.033	486	0.031	11590	12851
TOTAL	4360	0.041	404	0.041	585	0.033	17353	22702

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 3
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 1								
5120	354	0.050	12	0.069	3	0.035	388	757
5100	546	0.048	26	0.063	4	0.033	585	1161
5080	538	0.045	23	0.069	4	0.029	488	1053
5060	458	0.048	17	0.070	4	0.025	446	925
5040	412	0.047	16	0.073	4	0.022	396	828
5020	346	0.046	33	0.055	4	0.023	351	734
5000	313	0.044	27	0.054	8	0.024	268	616
4980	26	0.042	3	0.052	0	0.025	23	52
SUBTOTAL	2993	0.047	157	0.063	31	0.027	2945	6126
PHASE 2								
5280	13	0.028	2	0.056	1	0.020	245	261
5260	111	0.030	5	0.140	9	0.040	1702	1827
5240	111	0.045	34	0.037	3	0.052	1727	1875
5220	156	0.036	41	0.039	4	0.027	1637	1838
5200	213	0.040	32	0.048	0	0.000	1556	1801
5180	224	0.046	28	0.052	0	0.000	1513	1765
5160	253	0.041	19	0.042	0	0.000	1464	1736
5140	313	0.039	16	0.040	0	0.000	1371	1700
SUBTOTAL	1394	0.040	177	0.046	17	0.038	11215	12803

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 3
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 3								
5620	0	0.000	0	0.000	0	0.000	5	5
5600	0	0.000	0	0.000	0	0.000	15	15
5580	0	0.000	0	0.000	0	0.000	206	206
5560	0	0.000	0	0.000	9	0.032	710	719
5540	0	0.000	0	0.000	19	0.045	954	973
5520	0	0.000	4	0.026	29	0.040	1160	1193
5500	4	0.027	4	0.026	16	0.050	635	659
SUBTOTAL	4	0.027	8	0.026	73	0.043	3685	3770
TOTAL	4391	0.045	342	0.053	121	0.038	17845	22699

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 4
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE		MIXED ORE		OXIDE ORE		WASTE	TOTAL
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	KTONS
PHASE 1								
4980	235	0.042	31	0.052	4	0.025	196	466
4960	236	0.047	26	0.054	0	0.000	181	443
4940	168	0.051	9	0.066	0	0.000	170	347
4920	124	0.057	3	0.073	0	0.000	147	274
4900	80	0.063	4	0.059	0	0.000	116	200
4880	36	0.090	3	0.057	0	0.000	69	108
SUBTOTAL	879	0.051	76	0.056	4	0.025	879	1838
PHASE 2								
5120	363	0.037	21	0.035	0	0.000	1224	1608
5100	413	0.039	20	0.038	0	0.000	1127	1560
5080	449	0.041	26	0.037	0	0.000	1032	1507
5060	562	0.039	23	0.033	0	0.000	899	1484
5040	586	0.042	24	0.035	0	0.000	817	1427
5020	593	0.041	27	0.031	0	0.000	760	1380
5000	314	0.038	16	0.028	0	0.000	284	614
SUBTOTAL	3280	0.040	157	0.034	0	0.000	6143	9580

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 4
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 3								
5500	4	0.027	3	0.026	17	0.050	656	680
5480	8	0.029	15	0.028	37	0.054	1386	1446
5460	20	0.027	26	0.031	56	0.048	1455	1557
5440	37	0.028	29	0.029	68	0.048	1591	1725
5420	51	0.035	15	0.032	38	0.037	1774	1878
5400	71	0.035	1	0.025	50	0.038	1914	2036
5380	51	0.039	0	0.000	15	0.029	1894	1960
SUBTOTAL	242	0.034	89	0.030	281	0.045	10670	11282
TOTAL	4401	0.042	322	0.038	285	0.044	17692	22700

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 5
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE		MIXED ORE		OXIDE ORE		WASTE	TOTAL
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	KTONS
PHASE 2								
5000	378	0.038	23	0.028	0	0.000	342	743
4980	754	0.038	42	0.030	0	0.000	518	1314
4960	788	0.037	50	0.030	4	0.028	413	1255
4940	578	0.042	33	0.035	4	0.041	249	864
4920	533	0.043	42	0.045	4	0.046	215	794
4900	470	0.048	35	0.049	4	0.047	254	763
4880	93	0.051	7	0.050	0	0.000	74	174
SUBTOTAL	3594	0.041	232	0.037	16	0.041	2065	5907
PHASE 3								
5380	6	0.039	0	0.000	1	0.029	210	217
5360	70	0.039	4	0.027	2	0.030	2232	2308
5340	84	0.036	2	0.025	14	0.032	2353	2453
5320	76	0.037	11	0.027	21	0.039	2435	2543
5300	100	0.036	18	0.037	29	0.031	2500	2647
5280	177	0.030	21	0.037	20	0.038	2518	2736
5260	203	0.029	14	0.038	17	0.037	2480	2714
5240	96	0.028	10	0.032	6	0.034	1066	1178
SUBTOTAL	812	0.032	80	0.034	110	0.035	15794	16796
TOTAL	4406	0.039	312	0.036	126	0.036	17859	22703

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEUDLE - YEAR 6
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE		MIXED ORE		OXIDE ORE		WASTE	TOTAL
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	KTONS
PHASE 2								
4880	312	0.051	25	0.050	0	0.000	241	578
4860	388	0.056	21	0.044	0	0.000	348	757
4840	318	0.055	19	0.037	0	0.000	311	648
4820	264	0.045	12	0.034	0	0.000	289	565
4800	216	0.039	12	0.032	0	0.000	250	478
4780	180	0.036	13	0.030	0	0.000	202	395
4760	124	0.036	10	0.035	0	0.000	168	302
4740	93	0.034	7	0.039	0	0.000	117	217
4720	50	0.029	5	0.040	0	0.000	94	149
SUBTOTAL	1945	0.047	124	0.039	0	0.000	2020	4089
PHASE 3								
5240	121	0.028	13	0.032	7	0.034	1375	1516
5220	246	0.028	28	0.029	0	0.000	2374	2648
5200	272	0.030	16	0.030	0	0.000	2313	2601
5180	317	0.033	18	0.037	0	0.000	2206	2541
5160	340	0.033	9	0.061	0	0.000	2126	2475
5140	373	0.036	12	0.083	0	0.000	2033	2418
5120	420	0.036	7	0.024	0	0.000	1976	2403
5100	413	0.034	3	0.024	0	0.000	1602	2018
SUBTOTAL	2502	0.033	106	0.039	7	0.034	16005	18620
TOTAL	4447	0.039	230	0.039	7	0.034	18025	22709

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 7
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE		MIXED ORE		OXIDE ORE		WASTE	TOTAL
	KTONS	OZ/T	KTONS	OZ/T	KTONS	OZ/T	KTONS	KTONS
PHASE 3								
5100	65	0.034	0	0.024	0	0.000	259	324
5080	438	0.033	3	0.026	0	0.000	1847	2288
5060	533	0.034	0	0.000	0	0.000	1680	2213
5040	573	0.037	0	0.000	0	0.000	1580	2153
5020	605	0.039	20	0.033	0	0.000	1469	2094
5000	630	0.038	12	0.041	0	0.000	1373	2015
4980	649	0.036	20	0.035	0	0.000	1283	1952
4960	668	0.035	24	0.033	0	0.000	1200	1892
4940	357	0.035	9	0.030	3	0.032	498	867
SUBTOTAL	4518	0.036	88	0.034	3	0.032	11189	15798
TOTAL	4518	0.036	88	0.034	3	0.032	11189	15798

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 8
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 3								
4940	539	0.035	14	0.030	5	0.032	755	1313
4920	902	0.036	7	0.026	11	0.035	1207	2127
4900	866	0.036	8	0.025	8	0.033	1156	2038
4880	843	0.037	13	0.050	0	0.000	1103	1959
4860	823	0.038	25	0.034	0	0.000	1029	1877
4840	548	0.041	15	0.028	0	0.000	678	1241
SUBTOTAL	4521	0.037	82	0.033	24	0.034	5928	10555
TOTAL	4521	0.037	82	0.033	24	0.034	5928	10555

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 9
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	OZ/T	MIXED ORE KTONS	OZ/T	OXIDE ORE KTONS	OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 3								
4840	250	0.041	8	0.028	0	0.000	308	566
4820	776	0.044	10	0.025	0	0.000	934	1720
4800	761	0.042	1	0.045	0	0.000	879	1641
4780	706	0.041	7	0.026	0	0.000	832	1545
4760	653	0.041	10	0.026	0	0.000	827	1490
4740	581	0.042	4	0.028	3	0.036	812	1400
4720	570	0.043	7	0.033	4	0.036	694	1275
4700	239	0.042	5	0.033	2	0.038	288	534
SUBTOTAL	4536	0.042	52	0.028	9	0.036	5574	10171
TOTAL	4536	0.042	52	0.028	9	0.036	5574	10171

Table 4-13 - Continued

Brohm Gilt Edge Project

MINE PRODUCTION SCHEDULE - YEAR 10
Cutoff Grade (oz/ton): 0.022

	SULFIDE ORE KTONS	SULFIDE ORE OZ/T	MIXED ORE KTONS	MIXED ORE OZ/T	OXIDE ORE KTONS	OXIDE ORE OZ/T	WASTE KTONS	TOTAL KTONS
PHASE 3								
4700	315	0.042	7	0.033	2	0.038	382	706
4680	488	0.043	16	0.028	4	0.036	535	1043
4660	354	0.040	14	0.028	4	0.032	468	840
4640	299	0.038	1	0.035	0	0.000	357	657
4620	217	0.036	0	0.000	0	0.000	281	498
4600	128	0.037	0	0.000	0	0.000	224	352
4580	58	0.043	0	0.000	0	0.000	119	177
SUBTOTAL	1859	0.040	38	0.029	10	0.035	2366	4273
TOTAL	1859	0.040	38	0.029	10	0.035	2366	4273

5.0 MINE WASTE DISPOSAL

5.0 MINE WASTE DISPOSAL

5.1 Waste Characterization:

The production schedule contemplates that a total of 138 million tons of waste rock will be generated through the life of the Gilt Edge sulfide pit. Approximately 10 million tons of this waste rock will be needed to construct the flotation and cyanided tailings embankments. The remaining 128 million tons will be disposed of in waste dumps, or in road fill embankments which will eventually become incorporated into the waste dumps.

Based on the recommendations of Gilt Edge environmental and mining staff, the following basic criteria have been established for the characterization and disposal of waste rock:

> All waste of ore type 3 is characterized as oxide waste. Oxide waste contains no sulfide, will not generate acid leachate, and does not have to be dumped in lifts.
>
> All waste of ore types 1 and 2 is characterized as sulfide waste. This material may contain sufficient sulfide to create potential for acid leachate generation, and should therefore be dumped in lifts to minimize the possibility of vertical seepage through the dump, and to permit reclamation of the lower lifts while waste material is being dumped at higher levels.

Using these above criteria, 20.2 million tons of oxide waste and 117.8 million tons of sulfide waste will be generated through the mine life. The sulfide waste tonnage is probably an overestimate because not all of the waste in ore types 1 and 2 contains sulfide. However, a more representative breakdown cannot be made until more data on the sulfide content of Gilt Edge waste are acquired.

5.2 Design of Waste Dumps and Fill Areas:

General waste dump layouts have been designed so as to conform with the topography, with the boundary of the permit area, with the volumes of material requiring disposal (see Section 4.5), and with anticipated final slope and reclamation requirements. The specific design criteria and assumptions used are as follows:

a) The waste disposal schedule allows only for the mining and transportation of waste material from the pit to the disposal site, and for the placement of this waste material in waste dumps or in road embankments.

b) The schedule does not address waste dump preparation, dump drainage, pumpback systems, settling ponds or dump reclamation requirements, and it does not allow for the engineered placement of waste material in the tailings embankments.

c) Sulfide waste will be dumped in 50ft lifts in order to segregate the waste material and to create horizontal aquitards within the dump. Oxide waste can be dumped either in lifts or by crest-dumping.

d) Dump and fill volumes are calculated assuming final reclaimed slopes of 2.5:1. Material will be dumped at the angle of repose, but dump crests will be located so that the dump toes fall within the permit area after final grading is complete.

e) Dump and fill volume requirements are calculated using design bulk densities of 16.8 cu ft/ton and 16.0 cu ft/ton for uncompacted waste and compacted waste respectively. These densities were estimated using the rock type densities documented in Section 3.

f) The final waste dump configuration is designed so as to be free-draining, but the design is not optimized in relation to surface or groundwater hydrology, or to probable maximum precipitation considerations.

5.3 Waste Disposal Schedule:

Waste material will be mined and transported to the waste dumps on a three shifts per day, seven days per week basis. The schedule for generation and disposal of waste rock through the life of the Gilt Edge sulfide pit is summarized in Table 5-1:

TABLE 5-1

WASTE ROCK PRODUCTION AND DISPOSAL SCHEDULE

YEAR	KTONS MINED		KTONS DISPOSED OF IN			
	Oxide	Sulfide	Tailings Dams Flotn	Tailings Dams Cyand	Roads & Causeways	Waste Dumps
Prep	6,095		1,692	984	3,419	
		3,255			2,617	638
1	3,827				1,195	2,632
		9,673				9,673
2	4,744		1,493	1,033		2,218
		12,609				12,609
3	1,227		754	473		
		16,910				16,910
4	1,545		950	595		
		16,593				16,593
5	1,908		1,173	735		
		16,233				16,233
6	533		187	117		229
		17,614				17,614
7	186					186
		11,050				11,050
8	43					43
		5,950				5,950
9	85					85
		5,524				5,524
10	5					5
		2,390				2,390
TOTALS	20,198	117,801	6,249	3,937	7,231	120,582

Waste dump plans, prepared at a scale of 1" = 200' as Figures 5-1 through 5-8, are available under separate cover. Figure 5-1 shows topography in the waste dump areas at the end of the oxide pit. The extent of the waste dumps at the end of preproduction and at the end of Years 1, 2, 3, 5, 8 and 10 are shown on Figures 5-2 through 5-8.

Table 5-2 shows the capacity of the waste dumps broken down by lift and area number. The lift elevations are toe elevations. Dump area number locations are shown on Figures 5-2 through 5-8.

TABLE 5-2

WASTE DUMP CAPACITIES

	Ktons capacity in:						
LIFT	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Total
5600						15643	15643
5550						17200	17200
5500			2783			17643	20426
5450			2861			18399	21260
5400			2639			15982	18621
5350			1831		2913	6660	11404
5300		4137	804	6029	1639		12609
5250	146	2804	222	5078	664		8914
5200	229	1674		4073			5976
5150	234	827		2899			3960
5100	203	282		1687			2172
5050	239	39		744			1022
5000	156			229			385
Total	1208	9763	11141	20739	5215	91526	139592

During preproduction, almost all of the waste material generated is allocated for construction purposes. Approximately 6 million tons of material will be required to build causeways across Butcher Gulch for the tailings dam road. An additional 2.7 million tons of material will then be required to construct the initial flotation and cyanide tailings embankment raises.

The Butcher Gulch causeways will contain a mixture of sulfide and oxide waste, and will be built partially in 50 ft lifts and partially by crest-dumping. The tailings embankments will be built out of segregated oxide waste placed in 20 ft lifts. The small amount of sulfide waste not used for construction will be dumped in 50 ft lifts in Area 3 between the Butcher Gulch causeways and the plant site.

During Year 1, sulfide waste will be dumped in Areas 3 and 5 until these areas are full and free-draining. Area 3A will be partially filled with crest-dumped oxide waste. During year 1, crest-dumped oxide waste will also be used to construct fill roads to the bottom of the proposed Ruby Gulch and Butcher Gulch dumps (Area 1).

In Year 2, dumping of sulfide waste will commence in Butcher Gulch (Area 4), and an additional 2.5 million tons of oxide waste will be required to raise the tailings embankments. Substantially all of the oxide waste mined in years 3 through 6 will then be required to build the tailings embankments up to final elevation. This waste will be placed in the embankments as it is mined.

In Year 3, dumping of sulfide waste will commence in Ruby Gulch (Area 2) and dumping in Butcher Gulch will continue. By the end of Year 3, effectively all of the area allocated for waste dumps will have been covered. Thereafter, the dumps will be built up vertically, reaching their final crest elevations of between 5500 and 5600 by Year 10 (Area 6).

Figure 5-8 shows the final extent of the waste dumps. The dumps are confined within the area for which permits are being sought, and only limited sculpturing will be necessary to make them free-draining. The need to drain the plant site limits dump crest elevations to 5500ft or less over the central parts of the dump area.

Figures 5-2 through 5-8 show dump faces at the final reclaimed 2.5:1 slope angle. This slope angle will be achieved by dumping in 50ft lifts at the angle of repose while maintaining a horizontal separation of approximately 125ft between adjacent lift faces. Grading will then smooth the final slope to 2.5:1.

6.0 MINE EQUIPMENT

6.0 MINE EQUIPMENT

6.1 General:

Mine equipment requirements have been determined to match the ore and waste production schedules described in Sections 4 and 5, and in accordance with the basic parameters listed in Table 6-1.

TABLE 6-1

BASIC PARAMETERS USED TO DETERMINE EQUIPMENT REQUIREMENTS

Bench Height	20 feet
Preproduction Schedule	5 days/week 88 weeks in period 2 shifts/day 8 hours/shift
Mill Schedule	7 days/week 365 days/year
Mine Schedule	7 days/week 350 days/year 3 shifts/day 8 hours/shift
Operating minutes per 8-hour shift:	
Total available minutes	480
Shift change delay (15X2)	(30)
Lunch	(30)
Operating delays	(70)
Net operating time	350 minutes/shift
Number of Crews (with 20% overtime allowance)	4
Material densities:	
Mill ore	11.90 cu ft/ton
Leach ore	12.36
Waste	12.00
Swell factor	40 percent

The material densities were derived from the rock type densities documented in section 3, and from estimates of the relative percentage of each rock type in the different material types. The 40% swell factor was recommended by Gilt Edge Staff.

Drill requirements have been determined both for wet and for dry holes, and for blast hole and air track drills. Truck and shovel requirements are based on 13.5 cu yd shovels and 85 short ton trucks, and have been determined by measuring haul profiles and carrying out simulation analyses. Requirements for ancillary equipment have been calculated allowing for leach and mill ROM stockpile rehandling.

The mine equipment lists are used as the basis for determining mine personnel requirements and capital and operating costs, as discussed in Sections 7, 8 and 9.

6.2 Drills:

Two 7.25" diameter blast hole drills will be required during preproduction, and three after mine startup. One 3" diameter air track drill will be required through the mine life.

Productivities for the 7.25" drill in mill (sulfide) ore, leach ore and waste, and in wet and dry rock, are shown in Tables 6-2 and 6-3. Based on operating experience gained during the ongoing oxide operation at Gilt Edge and on a knowledge of the location of the water table in the mine area, it was assumed that 80% of blast holes drilled above the 5200 bench (the approximate current level of the water table) would be dry, and that 80% of the holes drilled below this level would be wet.

Operating requirements derived from these productivities are shown in Table 6-4. These requirements are calculated using the annual tonnages of mill ore, leach ore and waste given in the production schedule.

The 3" air track drill is to be used for road construction and miscellaneous activities in the mine area. Productivity and requirements for this unit are shown in Tables 6-5 and 6-6 respectively.

6.3 Shovels and Trucks:

13.5 cu yd hydraulic shovels and 85 short-ton trucks were selected for the Gilt Edge operation. The 13.5 cu yd shovel is a good size in that the number of shovels required (between 2 and 3) generally matches the number of working faces in the pit, and the size is also appropriate in relation to the 20ft bench height. The 85 short-ton truck size is a good match to the shovel size (the shovel can fill an 85-ton truck in 5.0 passes), and the total number of trucks required (17) is reasonable.

Table 6-7 shows loading productivities for the 13.5 cu yd shovel, and Table 6-8 shows annual operating requirements. Between two and three shovels will be required. Utilizations will range between 50 and 75% over most of the mine life.

Haul truck requirements through the mine life range between 7 and 17 units, and are summarized on Table 6-9. These requirements have been estimated from analysis of haul profiles and from haul time simulations. Haul profiles were measured on a bench-by-bench basis for each material type, and haul times for each material type were calculated by simulation. The rim pull performance data for the haul trucks were utilized in the simulations, and speed limits were applied to downhill hauls for safety reasons.

The results of the haul profile and truck/shovel simulations are attached in Appendices 6A and 6B at the back of this Section.

6.4 Stockpile Rehandling:

Two 75,000-ton run-of-mine stockpiles will be maintained near the oxide and the sulfide crushers. These stockpiles will be filled from haul trucks. Stockpiled material will then be transported to the crushers with front-end loaders.

Productivities for a 13.5 cu yd loader for the mill and leach ROM stockpiles are shown in Tables 6-10 and 6-11 respectively, and Table 6-12 shows material movements for the mill and leach ROM stockpiles. Equipment requirements derived from these data are shown for ROM stockpile rehandling only in Table 6-13, and for the stockpile rehandling plus miscellaneous mine service requirements in Table 6-14.

Table 6-14 shows that stockpile rehandling plus miscellaneous mine service activities will require only one 13.5 cu yd front end loader that will be utilized generally for less than one-third of the time. A smaller loader would be cheaper and more efficiently utilized. However, a 13.5 yd loader can be used as a backup for a 13.5 yd shovel in the pit while the smaller front-end loader cannot. For this reason, the larger loader is preferred.

6.5 Auxiliary Equipment:

The following auxiliary mobile equipment will be required:

UNITS	FUNCTION
370 NHP Dozer 285 NHP Dozer	Build access roads, ore crusher pads, grade/level waste dumps
165 NHP Dozer	Clearing & grubbing, catch bench cleaning, assist FEL in stockpile areas, miscellaneous.
315 NHP Dozer (rubber-tired)	Clean working faces around shovels. Maintain roads outside the pit. Assist with waste dump berms & berms on mill stockpile.
8000 gal Water Truck	Dust suppression
Motor Graders (16' moldboard)	Grade roads
Rock Breaker	Break large rocks remaining after blasting

Annual operating requirements for these items of equipment were determined by estimating total shifts, mechanical availability, utilization and other physical parameters (road width, bulk density etc). These requirements are summarized in Tables 6-15 through 6-21.

Table 6-2

Brohm Gilt Edge Project

Drill Productivity
Blast Hole Drill
(Dry Holes)

	Mill	Leach	Waste
Hole Diameter (in)	7.25	7.25	7.25
Bench Height (ft)	20.00	20.00	20.00
Subgrade	3.00	3.00	3.00
Powder Spg. Loaded	.82	.82	.82
Column Load (lbs/ft)	14.67	14.67	14.67
Powder Rise (ft)	10.33	9.94	10.24
Powder per Hole (lbs)	151.53	145.88	150.25
Powder Factor (lbs/st)	.46	.46	.46
Rock Mass per Hole (st)	329.42	317.14	326.64
Spacing and Burden (ft)	14.00	14.00	14.00
Drilling Rate (ft/hr)	102.00	118.00	102.00
Shift Drill Time (hr)	5.83	5.83	5.83
Shift Footage (ft)	594.66	687.94	594.66
Shift Production (st)	9517.	9486.	8445.

Table 6-3

Brohm Gilt Edge Project

Drill Productivity
Blast Hole Drill
(Wet Holes)

	Mill	Leach	Waste
Hole Diameter (in)	7.25	7.25	7.25
Bench Height (ft)	20.00	20.00	20.00
Subgrade	3.00	3.00	3.00
Powder Spg. Loaded	1.25	1.25	1.25
Column Load (lbs/ft)	22.36	22.36	22.36
Powder Rise (ft)	8.85	8.52	8.78
Powder per Hole (lbs)	197.92	190.56	196.29
Powder Factor (lbs/st)	.46	.46	.46
Rock Mass per Hole (st)	430.26	414.27	426.71
Spacing and Burden (ft)	16.00	16.00	16.00
Drilling Rate (ft/hr)	102.00	118.00	102.00
Shift Drill Time (hr)	5.83	5.83	5.83
Shift Footage (ft)	594.66	687.94	594.66
Shift Production (st)	11124.	12391.	11033.

Table 6-4

Brohm Gilt Edge Project

Equipment Operating Requirements
Blast Hole Drill (7.25 in)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	1104	2	0.63	3
Year 1	2012	3	0.64	8
Year 2	2216	3	0.70	9
Year 3	2329	3	0.74	9
Year 4	2328	3	0.74	9
Year 5	2427	3	0.77	10
Year 6	2256	3	0.72	9
Year 7	1499	2	0.71	6
Year 8	1000	2	0.48	4
Year 9	964	2	0.46	4
Year 10	405	1	0.77	3

Mechanical Availability = 0.90
Utilization of Availability = 0.95

Table 6-5

Brohm Gilt Edge Project

Drill Productivity
Air Track Drill

Hole Diameter (in)	3.00
Bench Height (ft)	20.00
Subgrade (ft)	3.00
Powder Spg. Loaded	.82
Column Load (lbs/ft)	2.51
Powder Rise (ft)	14.97
Powder per Hole (lbs)	37.60
Powder Factor (lbs/st)	.46
Rock Mass per Hole (st)	81.74
Spacing and Burden (ft)	7.00
Drilling Rate (ft/hr)	105.00
Shift Drill Time (hr)	5.83
Shift Footage (ft)	612.15
Shift Production (st)	2176.

Note: Based on an average material bank density of 12.00 cubic feet per ton.

Table 6-6

Brohm Gilt Edge Project

Equipment Operating Requirements
Air Track Drill (3 inch diameter hole)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	505	1	0.57	1
Year 1	423	1	0.40	2
Year 2	513	1	0.49	2
Year 3	175	1	0.17	1
Year 4	272	1	0.26	1
Year 5	207	1	0.20	1
Year 6	175	1	0.17	1
Year 7	175	1	0.17	1
Year 8	175	1	0.17	1
Year 9	175	1	0.17	1
Year 10	88	1	0.17	1

Mechanical Availability = 0.85
Utilization of Availability = 0.95

Table 6-7

Brohm Gilt Edge Project

Loading Productivity
Hydraulic Shovel

Bucket Capacity (lcy): 13.5
Truck Rated Payload (st): 90.0
Allowable Overloading of Truck Payload (%): 5.
Truck Body Capacity (lcy): 67.1
Loader Operating Time per Shift (min): 350.

	Mill	Leach	Waste
Bank Density (cu ft/st)	11.90	12.36	12.00
Swell (%)	40.00	40.00	40.00
Bucket Fill Factor	.86	.86	.86
Tons/Pass	18.82	18.12	18.66
Passes/Truck	5.00	5.00	5.00
Tons/Truck	94.08	90.58	93.29
Payload Fill Factor	1.05	1.01	1.04
Loader Time/Pass (min)	.60	.60	.60
Truck Spot Time (mine)	.40	.40	.40
Total Time/Truck (min)	3.40	3.40	3.40
Truck Loads/Shift	102.94	102.94	102.94
Shift Production (st)	9685.	9324.	9604.

Table 6-8

Brohm Gilt Edge Project

Equipment Operating Requirements
Hydraulic Shovel (13.5 yd)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	1038	2	0.59	3
Year 1	1964	3	0.62	8
Year 2	2362	3	0.75	9
Year 3	2360	3	0.75	9
Year 4	2360	3	0.75	9
Year 5	2360	3	0.75	9
Year 6	2361	3	0.75	9
Year 7	1641	3	0.52	7
Year 8	1095	2	0.52	4
Year 9	1055	2	0.50	4
Year 10	443	2	0.42	4

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Mill Ore (Tons/Shift) = 9685
Leach Ore (Tons/Shift) = 9324
Waste (Tons/Shift) = 9604

Table 6-9

Brohm Gilt Edge Project

Equipment Operating Requirements
Haulage Truck (85 st)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	4601	7	0.75	11
Year 1	8778	11	0.76	34
Year 2	13952	17	0.78	53
Year 3	13499	16	0.80	52
Year 4	13615	17	0.76	52
Year 5	12355	15	0.78	47
Year 6	14136	17	0.79	54
Year 7	10536	13	0.77	40
Year 8	8069	10	0.77	31
Year 9	9075	11	0.79	35
Year 10	4141	10	0.79	32

Mechanical Availability = 0.85
Utilization of Availability = 0.95

Table 6-10

Brohm Gilt Edge Project

Loading Productivity
Front End Loader
Leach ROM Stockpile Rehandle

Bucket Capacity (lcy): 13.5
Loader Operating Time per Shift (min): 350.

	Leach
Bank Density (cu ft/st)	12.36
Swell (%)	40.00
Bucket Fill Factor	.88
Tons/Pass	18.54
Loader Time/Pass (min)	1.17
Shift Production (st)	5545.

Table 6-11

Brohm Gilt Edge Project

Loading Productivity
Front End Loader
Mill ROM Stockpile Rehandle

Bucket Capacity (lcy): 13.5
Loader Operating Time per Shift (min): 350.

	Mill
Bank Density (cu ft/st)	11.90
Swell (%)	40.00
Bucket Fill Factor	.88
Tons/Pass	19.25
Loader Time/Pass (min)	1.17
Shift Production (st)	5760.

Table 6-12

Brohm Gilt Edge Project

Material Movement for ROM Stockpile Rehandling

Mill Stockpile % of Crusher Feed Rehandled: 20.00
Leach Stockpile % of Crusher Feed Rehandled: 100.00

Period	Mill Feed (kton)	Mill Stk Rehandle (kton)	Leach Feed (kton)	Leach Stk Rehandle (kton)
PREP	0	0	457	457
YR1	4562	912	816	816
YR2	4562	912	862	862
YR3	4562	912	0	0
YR4	4562	912	0	0
YR5	4562	912	0	0
YR6	4562	912	0	0
YR7	4562	912	0	0
YR8	4562	912	0	0
YR9	4562	912	0	0
YR10	1953	391	0	0
TOTAL	43011	8599	2135	2135

Table 6-13

Brohm Gilt Edge Project

Equipment Operating Requirements
Front End Loader (13.5 yd)
Mill and Leach ROM Stockpile Rehandling

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	82	1	0.09	
Year 1	305	1	0.29	1
Year 2	314	1	0.30	1
Year 3	158	1	0.15	1
Year 4	158	1	0.15	1
Year 5	158	1	0.15	1
Year 6	158	1	0.15	1
Year 7	158	1	0.15	1
Year 8	158	1	0.15	1
Year 9	158	1	0.15	1
Year 10	68	1	0.13	1

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Mill Ore (Tons/Shift) = 5760
Leach Ore (Tons/Shift) = 5545

Table 6-14

Brohm Gilt Edge Project

Equipment Operating Requirements
Front End Loader (13.5 yd)
ROM Stockpile Rehandling and Mine Service

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	302	1	0.34	1
Year 1	480	1	0.46	2
Year 2	489	1	0.47	2
Year 3	333	1	0.32	2
Year 4	333	1	0.32	2
Year 5	333	1	0.32	2
Year 6	333	1	0.32	2
Year 7	333	1	0.32	2
Year 8	333	1	0.32	2
Year 9	333	1	0.32	2
Year 10	156	1	0.30	1

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Stockpile Rehandling:
Mill Ore (Tons/Shift) = 5760
Leach Ore (Tons/Shift) = 5545

Mine Production:
Mill Ore (Tons/Shift) = 7190
Leach Ore (Tons/Shift) = 7052
Waste (Tons/Shift) = 7190

Table 6-15

Brohm Gilt Edge Project

Equipment Operating Requirements
Track Dozer (165 NHP)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	440	1	0.50	1
Year 1	525	1	0.50	2
Year 2	525	1	0.50	2
Year 3	525	1	0.50	2
Year 4	525	1	0.50	2
Year 5	525	1	0.50	2
Year 6	525	1	0.50	2
Year 7	525	1	0.50	2
Year 8	525	1	0.50	2
Year 9	525	1	0.50	2
Year 10	263	1	0.50	2

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Table 6-16

Brohm Gilt Edge Project

Equipment Operating Requirements
Track Dozer (285 NHP)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	572	1	0.65	2
Year 1	682	1	0.65	3
Year 2	682	1	0.65	3
Year 3	682	1	0.65	3
Year 4	682	1	0.65	3
Year 5	682	1	0.65	3
Year 6	682	1	0.65	3
Year 7	682	1	0.65	3
Year 8	682	1	0.65	3
Year 9	682	1	0.65	3
Year 10	341	1	0.65	3

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Table 6-17

Brohm Gilt Edge Project

Equipment Operating requirements
Track Dozer (370 NHP)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	1146	2	0.65	3
Year 1	1339	2	0.64	5
Year 2	1367	2	0.65	6
Year 3	1260	2	0.60	5
Year 4	1291	2	0.61	5
Year 5	1270	2	0.60	5
Year 6	1260	2	0.60	5
Year 7	1260	2	0.60	5
Year 8	1260	2	0.60	5
Year 9	1260	2	0.60	5
Year 10	630	2	0.60	5

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Table 6-18

Brohm Gilt Edge Project

Equipment Operating Requirements
Tire Dozer (315 NHP)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	1583	3	0.60	4
Year 1	1996	3	0.63	8
Year 2	2394	3	0.76	9
Year 3	2308	3	0.73	9
Year 4	2350	3	0.75	9
Year 5	2241	3	0.71	9
Year 6	2309	3	0.73	9
Year 7	1986	3	0.63	8
Year 8	1894	3	0.60	8
Year 9	1939	3	0.62	8
Year 10	950	3	0.60	8

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Table 6-19

Brohm Gilt Edge Project

Equipment Operating Requirements
Water Truck (8,000 Gal)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	710	1	0.81	2
Year 1	951	2	0.45	4
Year 2	1472	2	0.70	6
Year 3	1258	2	0.60	5
Year 4	1342	2	0.64	5
Year 5	1186	2	0.56	5
Year 6	1260	2	0.60	5
Year 7	859	2	0.41	4
Year 8	746	2	0.36	3
Year 9	801	2	0.38	3
Year 10	375	2	0.36	3

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Table 6-20

Brohm Gilt Edge Project

Equipment Operating Requirements
Motor Grader (16ft)

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	653	1	0.74	2
Year 1	920	2	0.44	4
Year 2	1577	2	0.75	6
Year 3	1334	2	0.64	5
Year 4	1432	2	0.68	6
Year 5	1239	2	0.59	5
Year 6	1336	2	0.64	5
Year 7	824	2	0.39	3
Year 8	680	2	0.32	3
Year 9	750	2	0.36	3
Year 10	344	2	0.33	3

Mechanical Availability = 0.80
Utilization of Availability = 0.95

Table 6-21

Brohm Gilt Edge Project

Equipment Operating Requirements
Rock Breaker

Period	Operating Shifts	Total Fleet	Utilization	Operators
Prep	110	1	0.13	1
Year 1	200	1	0.19	1
Year 2	250	1	0.24	1
Year 3	250	1	0.24	1
Year 4	250	1	0.24	1
Year 5	250	1	0.24	1
Year 6	250	1	0.24	1
Year 7	174	1	0.17	1
Year 8	116	1	0.11	1
Year 9	112	1	0.11	1
Year 10	47	1	0.09	1

Mechanical Availability = 0.80
Utilization of Availability = 0.95

APPENDIX A

A P P E N D I X   A

Brohm Gilt Edge Project

Truck Profiles

Year 4

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
4960.	505.	mcr	m	.0	800.	10.0	1600.	.0	300.	-10.0	200.	.0	250.	10.0	2200.
				.0	250.	10.0	1200.	.0	1300.	10.0	1200.	.0	800.	6.0	500.
				.0	380.										
4920.	297.	mcr	m	.0	230.	10.0	1600.	.0	200.	10.0	600.	.0	250.	10.0	2200.
				.0	250.	10.0	800.	.0	1350.	10.0	1600.	.0	800.	6.0	500.
				.0	380.										
4880.	119.	mcr	m	.0	120.	10.0	1600.	.0	500.	10.0	1000.	.0	250.	10.0	2200.
				.0	250.	10.0	400.	.0	1320.	10.0	2000.	.0	800.	6.0	500.
				.0	380.										
5100.	796.	mcr	m	.0	1340.	10.0	400.	.0	250.	10.0	2200.	.0	250.	10.0	1000.
				.0	1300.	10.0	1400.	.0	800.	6.0	500.	.0	380.		
5060.	1035.	mcr	m	.0	1250.	10.0	800.	.0	250.	10.0	2200.	.0	250.	10.0	600.
				.0	1350.	10.0	1800.	.0	800.	6.0	500.	.0	380.		
5020.	1204.	mcr	m	.0	1140.	10.0	1200.	.0	250.	10.0	2200.	.0	250.	10.0	200.
				.0	1350.	10.0	2200.	.0	800.	6.0	500.	.0	380.		
5000.	322.	mcr	m	.0	1040.	10.0	1400.	.0	250.	10.0	2200.	.0	250.	.0	1340.
				10.0	2400.	.0	800.	6.0	500.	.0	380.				
5480.	20.	mcr	m	.0	740.	10.0	1200.	.0	800.	6.0	500.	.0	380.		
5440.	84.	mcr	m	.0	960.	10.0	1600.	.0	800.	6.0	500.	.0	380.		
5400.	129.	mcr	m	.0	1340.	10.0	2000.	.0	800.	6.0	500.	.0	380.		
5380.	51.	mcr	m	.0	1360.	10.0	2200.	.0	800.	6.0	500.	.0	380.		
4960.	404.	dmp6	w	.0	800.	10.0	1600.	.0	300.	10.0	200.	.0	250.	10.0	2200.
				.0	250.	10.0	1400.	.0	1200.	.0	2020.	.0	2050.	-6.0	500.
				-9.0	780.	.0	1100.								
4920.	324.	dmp6	w	.0	230.	10.0	1600.	.0	200.	10.0	600.	.0	250.	10.0	2200.
				.0	250.	10.0	1400.	.0	1200.	.0	2020.	.0	2050.	-6.0	500.
				-9.0	780.	.0	1100.								
4880.	189.	dmp6	w	.0	120.	10.0	1600.	.0	500.	10.0	1000.	.0	250.	10.0	2200.
				.0	250.	10.0	1400.	.0	1200.	.0	2020.	.0	2050.	-6.0	500.
				-9.0	780.	.0	1100.								
5100.	2372.	dmp6	w	.0	1340.	10.0	400.	.0	250.	10.0	2200.	.0	250.	10.0	1400.
				.0	1200.	.0	2020.	.0	2050.	-6.0	500.	-9.0	780.	.0	1100.
5060.	1956.	dmp6	w	.0	1250.	10.0	800.	.0	250.	10.0	2200.	.0	250.	10.0	1400.
				.0	1200.	.0	2020.	.0	2050.	-6.0	500.	-9.0	780.	.0	1100.
5020.	1603.	dmp6	w	.0	1140.	10.0	1200.	.0	250.	10.0	2200.	.0	250.	.0	1350.
				8.0	1750.	.0	2050.	-6.0	500.	-9.0	780.	.0	1100.		
5000.	292.	dmp6	w	.0	1040.	10.0	1400.	.0	250.	10.0	2200.	.0	250.	.0	1340.
				8.0	1750.	.0	2050.	-6.0	500.	-9.0	233.	.0	1350.		
5480.	950.	fdam	w	.0	740.	10.0	200.	.0	3220.	.0	2050.	.0	1970.	8.0	1250.
				.0	300.	-8.0	2500.	-2.0	1500.	-6.0	2416.	.0	2380.	-5.0	2500.
				-10.0	500.	-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	350.	.0	2000.
5480.	595.	cdam	w	.0	740.	10.0	200.	.0	3220.	.0	2050.	.0	1970.	8.0	1250.
				.0	300.	-8.0	2500.	-2.0	1500.	-6.0	2416.	-6.0	1666.	-6.0	660.
				.0	100.										
5480.	561.	dmp6	w	.0	740.	10.0	200.	.0	3220.	.0	2050.	-6.0	500.	-9.0	233.
				.0	1350.										
5440.	3198.	dmp6	w	.0	960.	10.0	600.	.0	3220.	.0	2050.	-6.0	500.	-9.0	233.
				.0	1350.										
5400.	3785.	dmp6	w	.0	1340.	10.0	1000.	.0	3220.	.0	2050.	-6.0	500.	-9.0	233.
				.0	1350.										
5380.	1909.	dmp6	w	.0	1360.	10.0	1200.	.0	3220.	.0	2050.	-6.0	500.	-9.0	233.
				.0	1350.										

INDEPENDENT MINING CONSULTANTS, INC.

Brohm Gilt Edge Project

Truck Profiles

Year 5

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
5000.	392.	mcr	m	.0	1040.	10.0	1400.	.0	250.	10.0	2200.	.0	250.	.0	1340.
				10.0	2400.	.0	800.	6.0	500.	.0	380.				
4960.	1588.	mcr	m	.0	800.	10.0	1800.	.0	250.	10.0	1800.	.0	1520.	10.0	2800.
				.0	800.	6.0	500.	.0	380.						
4920.	1148.	mcr	m	.0	650.	10.0	2200.	.0	250.	10.0	1400.	.0	940.	10.0	3200.
				.0	800.	6.0	500.	.0	380.						
4880.	583.	mcr	m	.0	200.	10.0	2600.	.0	250.	10.0	1000.	.0	1280.	10.0	400.
				.0	250.	10.0	3200.	.0	800.	6.0	500.	.0	380.		
5360.	78.	mcr	m	.0	1340.	10.0	2400.	.0	800.	6.0	500.	.0	380.		
5320.	166.	mcr	m	.0	1220.	10.0	2800.	.0	800.	6.0	500.	.0	380.		
5280.	296.	mcr	m	.0	1000.	10.0	3200.	.0	800.	6.0	500.	.0	380.		
5240.	311.	mcr	m	.0	900.	10.0	400.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5000.	351.	dmp6	w	.0	1040.	10.0	1400.	.0	250.	10.0	2200.	.0	250.	.0	1340.
				8.0	1750.	.0	2050.	-6.0	500.	-9.0	233.	.0	1350.		
4960.	981.	dmp6	w	.0	800.	10.0	1800.	.0	250.	10.0	1800.	.0	1520.	10.0	400.
				8.0	1750.	.0	2050.	-6.0	500.	-9.0	233.	.0	1350.		
4920.	510.	dmp6	w	.0	650.	10.0	2200.	.0	250.	10.0	1400.	.0	940.	10.0	800.
				8.0	1750.	.0	2050.	-6.0	500.	-9.0	233.	.0	1350.		
4880.	354.	dmp6	w	.0	200.	10.0	2600.	.0	250.	10.0	1000.	.0	1280.	10.0	400.
				.0	250.	10.0	800.	8.0	1750.	.0	2050.	-6.0	500.	-9.0	233.
				.0	1350.										
5360.	1173.	fdam	w	.0	1340.	8.0	1750.	.0	2050.	.0	1970.	8.0	1250.	.0	300.
				-8.0	2500.	-2.0	1500.	-6.0	2416.	.0	2380.	-5.0	2500.	-10.0	500.
				-5.0	1000.	-10.0	500.	-5.0	200.	.0	1520.				
5360.	735.	cdam	w	.0	1340.	8.0	1750.	.0	2050.	.0	1970.	8.0	1250.	.0	300.
				-8.0	2500.	-2.0	1500.	-6.0	2416.	-6.0	1666.	-6.0	420.	.0	100.
5360.	539.	dmp6	w	.0	1340.	8.0	1750.	.0	2050.	-6.0	500.	-9.0	233.	.0	1350.
5320.	4830.	dmp6	w	.0	1220.	10.0	400.	8.0	1750.	.0	2050.	.0	1300.		
5280.	5087.	dmp6	w	.0	1000.	10.0	800.	8.0	1750.	.0	2050.	.0	1300.		
5240.	3581.	dmp6	w	.0	900.	10.0	400.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	1300.										

Brohm Gilt Edge Project

Truck Profiles

Year 6

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
4880.	329.	mcr	m	.0	840.	10.0	2600.	.0	250.	10.0	1000.	.0	1280.	10.0	400.
				.0	250.	10.0	3200.	.0	800.	6.0	500.	.0	380.		
4840.	725.	mcr	m	.0	350.	10.0	3000.	.0	250.	10.0	600.	.0	1240.	10.0	800.
				.0	250.	10.0	3200.	.0	800.	6.0	500.	.0	380.		
4800.	492.	mcr	m	.0	400.	10.0	3400.	.0	250.	10.0	200.	.0	1250.	10.0	1200.
				.0	250.	10.0	3200.	.0	800.	6.0	500.	.0	380.		
4760.	315.	mcr	m	.0	350.	10.0	3600.	.0	1020.	10.0	1600.	.0	250.	10.0	3200.
				.0	800.	6.0	500.	.0	380.						
4720.	148.	mcr	m	.0	300.	10.0	3600.	.0	800.	10.0	2000.	.0	250.	10.0	3200.
				.0	800.	6.0	500.	.0	380.						
5240.	127.	mcr	m	.0	1100.	10.0	400.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5200.	540.	mcr	m	.0	900.	10.0	800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5160.	670.	mcr	m	.0	920.	10.0	1200.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5120.	802.	mcr	m	.0	800.	10.0	1600.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5100.	414.	mcr	m	.0	960.	10.0	1800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4880.	249.	dmp6	w	.0	840.	10.0	2600.	.0	250.	10.0	1000.	.0	1280.	10.0	400.
				.0	250.	10.0	800.	8.0	1750.	.0	2050.	.0	700.	8.0	625.
				.0	1300.										
4840.	680.	dmp6	w	.0	350.	10.0	3000.	.0	250.	10.0	600.	.0	1240.	10.0	800.
				.0	250.	10.0	800.	8.0	1750.	.0	2050.	.0	700.	8.0	625.
				.0	1300.										
4800.	551.	dmp6	w	.0	400.	10.0	3400.	.0	250.	10.0	200.	.0	1250.	10.0	1200.
				.0	250.	10.0	800.	8.0	1750.	.0	2050.	.0	700.	8.0	625.
				.0	1300.										
4760.	382.	dmp6	w	.0	350.	10.0	3600.	.0	1020.	10.0	1600.	.0	250.	10.0	800.
				8.0	1750.	.0	2050.	.0	700.	8.0	625.	.0	1300.		
4720.	218.	dmp6	w	.0	300.	10.0	3600.	.0	800.	10.0	2000.	.0	250.	10.0	800.
				8.0	1750.	.0	2050.	.0	700.	8.0	625.	.0	1300.		
5240.	187.	fdam	w	.0	1100.	10.0	400.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	1300.	8.0	625.	.0	750.	8.0	625.	.0	300.	-8.0	2500.
				-2.0	1500.	-6.0	2416.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.
				-10.0	500.	-5.0	200.	.0	1520.						
5240.	117.	cdam	w	.0	1100.	10.0	400.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	1300.	8.0	625.	.0	750.	8.0	625.	.0	300.	-8.0	2500.
				-2.0	1500.	-6.0	2416.	-6.0	1666.	-6.0	420.	.0	100.		
5240.	1085.	dmp6	w	.0	1100.	10.0	400.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	700.	8.0	625.	.0	1300.						
5200.	4709.	dmp6	w	.0	900.	10.0	800.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	700.	8.0	625.	.0	1300.						
5160.	4346.	dmp6	w	.0	920.	10.0	1200.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	700.	8.0	625.	.0	1300.						
5120.	4019.	dmp6	w	.0	800.	10.0	1600.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	700.	8.0	625.	.0	1300.						
5100.	1604.	dmp6	w	.0	960.	10.0	1800.	.0	250.	10.0	800.	8.0	1750.	.0	2050.
				.0	700.	8.0	625.	.0	1300.						

Brohm Gilt Edge Project

Truck Profiles

Year 7

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
5100.	66.	mcr	m	.0	960.	10.0	1800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5060.	972.	mcr	m	.0	1000.	10.0	2200.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5020.	1188.	mcr	m	.0	1300.	10.0	2600.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4980.	1295.	mcr	m	.0	1700.	10.0	3000.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4940.	1041.	mcr	m	.0	2700.	10.0	3400.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
5100.	258.	dmp6	w	.0	960.	10.0	1800.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
5060.	3529.	dmp6	w	.0	1000.	10.0	2200.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
5020.	3059.	dmp6	w	.0	1300.	10.0	2600.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
4980.	2672.	dmp6	w	.0	1700.	10.0	3000.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
4940.	1718.	dmp6	w	.0	2700.	10.0	3400.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										

Brohm Gilt Edge Project

Truck Profiles

Year 8

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
4940.	548.	mcr	m	.0	2400.	10.0	3400.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4900.	1775.	mcr	m	.0	2000.	10.0	3800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4860.	1684.	mcr	m	.0	1300.	10.0	4200.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4840.	555.	mcr	m	.0	1000.	10.0	4400.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4940.	765.	dmp6	w	.0	2400.	10.0	3400.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
4900.	2390.	dmp6	w	.0	2000.	10.0	3800.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
4860.	2152.	dmp6	w	.0	1300.	10.0	4200.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										
4840.	686.	dmp6	w	.0	1000.	10.0	4400.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				.0	1000.										

Brohm Gilt Edge Project

Truck Profiles

Year 9

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
4840.	256.	mcr	m	.0	1650.	10.0	4400.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4800.	1542.	mcr	m	.0	1150.	10.0	4800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4760.	1367.	mcr	m	.0	560.	10.0	5200.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4720.	1156.	mcr	m	.0	520.	10.0	5600.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4700.	241.	mcr	m	.0	500.	10.0	5800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4840.	310.	dmp6	w	.0	1650.	10.0	4400.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4800.	1819.	dmp6	w	.0	1150.	10.0	4800.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4760.	1668.	dmp6	w	.0	560.	10.0	5200.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4720.	1519.	dmp6	w	.0	520.	10.0	5600.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4700.	293.	dmp6	w	.0	500.	10.0	5800.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				

Brohm Gilt Edge Project

Truck Profiles

Year 10

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
4700.	319.	mcr	m	.0	500.	10.0	5800.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4660.	857.	mcr	m	.0	370.	10.0	6200.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4620.	516.	mcr	m	.0	320.	10.0	6600.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4580.	186.	mcr	m	.0	200.	10.0	7000.	.0	250.	10.0	3200.	.0	800.	6.0	500.
				.0	380.										
4700.	387.	dmp6	w	.0	500.	10.0	5800.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4660.	1026.	dmp6	w	.0	370.	10.0	6200.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4620.	639.	dmp6	w	.0	320.	10.0	6600.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				
4580.	343.	dmp6	w	.0	200.	10.0	7000.	.0	250.	10.0	800.	8.0	1750.	8.0	1250.
				-8.0	1250.	.0	600.	8.0	1250.	.0	700.				

Brohm Gilt Edge Project

Truck Profiles

Prep

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
5620.	1.	lstk	l	.0	250.	-10.0	200.	-4.0	550.	-10.0	200.	10.0	400.	.0	500.
				10.0	200.	.0	200.								
5600.	25.	lstk	l	.0	350.	-4.0	550.	-10.0	200.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5580.	25.	lstk	l	.0	300.	.0	800.	-10.0	200.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5560.	29.	lstk	l	.0	420.	.0	500.	.0	350.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5540.	46.	lstk	l	.0	300.	.0	200.	.0	380.	10.0	200.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5520.	51.	lstk	l	.0	300.	.0	240.	.0	270.	10.0	400.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5500.	49.	lstk	l	.0	300.	.0	430.	.0	200.	10.0	600.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5480.	46.	lstk	l	.0	300.	.0	410.	.0	150.	10.0	800.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5460.	5.	mcr	m	.0	300.	.0	440.	.0	350.	10.0	1000.	.0	350.	10.0	400.
				.0	1220.	6.0	500.	.0	180.	.0	200.				
5460.	56.	lstk	l	.0	300.	.0	440.	.0	350.	10.0	1000.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5440.	5.	mcr	m	.0	300.	.0	780.	4.0	450.	10.0	1000.	.0	350.	10.0	400.
				.0	1220.	6.0	500.	.0	180.	.0	200.				
5440.	33.	lstk	l	.0	300.	.0	780.	4.0	450.	10.0	1000.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5420.	40.	mcr	m	.0	300.	.0	980.	10.0	200.	3.0	650.	10.0	1000.	.0	350.
				10.0	400.	.0	1220.	6.0	500.	.0	180.	.0	200.		
5420.	37.	lstk	l	.0	300.	.0	980.	10.0	200.	3.0	650.	10.0	1000.	.0	350.
				10.0	400.	.0	500.	10.0	200.	.0	200.				
5560.	8.	lstk	l	.0	350.	.0	550.	10.0	400.	.0	500.	10.0	200.	.0	200.
5540.	4.	mcr	m	.0	350.	10.0	200.	.0	350.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5540.	19.	lstk	l	.0	350.	10.0	200.	.0	350.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5520.	4.	mcr	m	.0	760.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5520.	26.	lstk	l	.0	760.	10.0	400.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5500.	6.	mcr	m	.0	850.	8.0	250.	10.0	400.	.0	450.	10.0	400.	.0	1220.
				6.0	500.	.0	380.								
5500.	36.	lstk	l	.0	850.	8.0	250.	10.0	400.	.0	450.	10.0	400.	.0	500.
				10.0	200.	.0	200.								
5480.	11.	mcr	m	.0	750.	8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.
				6.0	500.	.0	380.								
5480.	43.	lstk	l	.0	750.	8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	500.
				10.0	200.	.0	200.								
5620.	7.	fill1	w	.0	250.	-10.0	200.	-4.0	550.	-10.0	200.	.0	150.	-10.0	600.
				.0	1300.	1.0	200.								
5600.	167.	fill1	w	.0	350.	-4.0	550.	-10.0	200.	.0	150.	-10.0	600.	.0	1500.
5580.	303.	fill1	w	.0	300.	.0	800.	-10.0	200.	.0	150.	-10.0	600.	.0	1500.
5560.	405.	fill1	w	.0	420.	.0	500.	.0	350.	.0	220.	.0	150.	-10.0	600.
				.0	1500.										
5540.	58.	fill1	w	.0	300.	.0	200.	.0	380.	10.0	200.	.0	720.	-10.0	600.
				.0	1500.										
5540.	202.	fill2	w	.0	300.	.0	200.	.0	380.	10.0	200.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	.0	100.						
5540.	192.	fill3	w	.0	300.	.0	200.	.0	380.	10.0	200.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	300.				
5520.	568.	fill3	w	.0	300.	.0	240.	.0	270.	10.0	400.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	300.				
5500.	602.	fill3	w	.0	300.	.0	430.	.0	200.	10.0	600.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	300.				
5480.	494.	fill3	w	.0	300.	.0	410.	.0	150.	10.0	800.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	300.				
5480.	151.	fill4	w	.0	300.	.0	410.	.0	150.	10.0	800.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	1300.				
5460.	765.	fill4	w	.0	300.	.0	440.	.0	350.	10.0	1000.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	1300.				
5440.	838.	fill4	w	.0	300.	.0	780.	4.0	450.	10.0	1000.	.0	720.	-10.0	600.
				.0	2000.	-6.0	500.	-9.0	780.	.0	1300.				
5420.	905.	fill4	w	.0	300.	.0	980.	10.0	200.	3.0	650.	10.0	1000.	.0	720.
				-10.0	600.	.0	2000.	-6.0	500.	-9.0	780.	.0	1300.		
5640.	10.	fill4	w	.0	150.	-10.0	1800.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1300.						
5620.	50.	fill4	w	.0	150.	-10.0	1600.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1300.						
5600.	55.	fill4	w	.0	180.	-10.0	1400.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1300.						
5600.	37.	fill4	w	.0	120.	-4.0	550.	-10.0	200.	.0	150.	-10.0	600.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1300.						
5580.	104.	fill4	w	.0	200.	-10.0	1200.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1300.						
5580.	123.	fill4	w	.0	300.	.0	500.	-10.0	200.	.0	150.	-10.0	600.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1300.						
5580.	85.	cdam	w	.0	300.	.0	500.	-10.0	200.	.0	150.	-10.0	600.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	4580.	-10.0	750.	.0	300.
5560.	201.	cdam	w	.0	200.	-10.0	1000.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	4580.	-10.0	750.	.0	300.
5560.	201.	cdam	w	.0	350.	.0	920.	-10.0	600.	.0	2000.	-6.0	500.	-9.0	780.
				.0	1900.	-6.0	4580.	-10.0	750.	.0	300.				
5560.	43.	cdam	w	.0	350.	.0	920.	-10.0	600.	.0	2000.	-6.0	500.	-9.0	780.
				.0	1900.	-6.0	4580.	-10.0	750.	.0	300.				
5540.	207.	cdam	w	.0	250.	-10.0	800.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	4580.	-10.0	750.	.0	300.
5540.	247.	cdam	w	.0	350.	10.0	200.	.0	720.	-10.0	600.	.0	2000.	-6.0	500.
				-9.0	780.	.0	1900.	-6.0	4580.	-10.0	750.	.0	300.		
5540.	63.	fdam	w	.0	350.	10.0	200.	.0	720.	-10.0	600.	.0	2000.	-6.0	500.
				-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.
				-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	1150.	.0	1900.		
5520.	210.	fdam	w	.0	360.	-10.0	600.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.
				-10.0	500.	-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	1150.	.0	1900.
5520.	214.	fdam	w	.0	300.	.0	460.	10.0	400.	.0	600.	-10.0	600.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.
				-10.0	500.	-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	1150.	.0	1900.
5520.	205.	fdam	w	.0	300.	.0	460.	10.0	400.	.0	600.	-10.0	600.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.
				-10.0	500.	-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	1150.	.0	1900.
5500.	257.	fdam	w	.0	300.	.0	150.	-10.0	400.	10.0	200.	8.0	250.	.0	960.
				.0	2000.	-6.0	500.	-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.
				-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	1150.
				.0	1900.										
5500.	515.	fdam	w	.0	300.	.0	550.	.0	960.	.0	2000.	-6.0	500.	-9.0	780.
				.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.
				-10.0	500.	-5.0	500.	-10.0	1150.	.0	1900.				
5480.	229.	fdam	w	.0	600.	-10.0	200.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.
				-10.0	500.	-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	1150.	.0	1900.
5480.	59.	dmp3	w	.0	600.	-10.0	200.	10.0	200.	8.0	250.	.0	960.	.0	2000.
				-6.0	500.	-9.0	780.	.0	650.	-8.0	600.	.0	350.		
5480.	428.	dmp3	w	.0	300.	.0	450.	8.0	250.	.0	960.	.0	2000.	-6.0	500.
				-9.0	780.	.0	650.	-8.0	600.	.0	350.				
5480.	150.	dmp3	w	.0	300.	.0	450.	8.0	250.	.0	960.	.0	2000.	-6.0	500.
				-9.0	780.	.0	650.	-8.0	600.	.0	350.				

Brohm Gilt Edge Project

Truck Profiles

Year 1

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
5400.	154.	mcr	m	.0	840.	10.0	400.	3.0	650.	10.0	1000.	.0	350.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5400.	64.	lstk	l	.0	840.	10.0	400.	3.0	650.	10.0	1000.	.0	350.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5380.	218.	mcr	m	.0	600.	-10.0	200.	.0	250.	10.0	2000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5360.	83.	lstk	l	.0	600.	-10.0	200.	.0	250.	10.0	2000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5360.	289.	mcr	m	.0	810.	.0	250.	10.0	2000.	.0	450.	10.0	400.	.0	1220.
				6.0	500.	.0	380.								
5360.	67.	lstk	l	.0	810.	.0	200.	10.0	2000.	.0	450.	10.0	400.	.0	500.
				10.0	200.	.0	200.								
5340.	410.	mcr	m	.0	940.	10.0	2200.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5340.	99.	lstk	l	.0	940.	10.0	2200.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5320.	497.	mcr	m	.0	760.	10.0	2400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5320.	109.	lstk	l	.0	760.	10.0	2400.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5300.	566.	mcr	m	.0	750.	10.0	2600.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5300.	91.	lstk	l	.0	750.	10.0	2600.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5280.	640.	mcr	m	.0	730.	10.0	2800.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5280.	111.	lstk	l	.0	730.	10.0	2800.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5260.	683.	mcr	m	.0	1000.	10.0	3000.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5260.	87.	lstk	l	.0	1000.	10.0	3000.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5240.	341.	mcr	m	.0	460.	10.0	3200.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5240.	34.	lstk	l	.0	460.	10.0	3200.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5460.	15.	mcr	m	.0	1100.	.0	250.	10.0	1000.	.0	450.	10.0	400.	.0	1220.
				6.0	500.	.0	380.								
5460.	40.	lstk	l	.0	1100.	.0	250.	10.0	1000.	.0	450.	10.0	400.	.0	500.
				10.0	200.	.0	200.								
5460.	5.	mcr	m	.0	770.	10.0	1000.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5460.	13.	lstk	l	.0	770.	10.0	1000.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5440.	10.	mcr	m	.0	1120.	10.0	200.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5440.	9.	lstk	l	.0	1120.	10.0	200.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5440.	11.	mcr	m	.0	440.	10.0	200.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5440.	7.	lstk	l	.0	440.	10.0	200.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5360.	120.	mcr	m	.0	100.	-10.0	200.	10.0	200.	.0	250.	10.0	2000.	.0	450.
				10.0	400.	.0	1220.	6.0	500.	.0	380.				
5360.	218.	mcr	m	.0	280.	.0	300.	10.0	2000.	.0	450.	10.0	400.	.0	120.
				6.0	500.	.0	380.								
5600.	387.	mcr	m	.0	920.	6.0	500.	.0	380.						
5400.	1037.	dmp1	w	.0	840.	10.0	400.	3.0	650.	10.0	1000.	.0	350.	.0	370.
				-10.0	600.	.0	2000.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.
				.0	150.										
5380.	1141.	dmp3	w	.0	600.	-10.0	200.	.0	250.	10.0	1400.	.0	2960.	-6.0	500.
				-9.0	780.	.0	600.	.0	700.						
5360.	1240.	dmp3	w	.0	810.	.0	250.	10.0	1400.	.0	2960.	-6.0	500.	-9.0	230.
				.0	1000.										
5340.	1528.	dmp3	w	.0	940.	10.0	1600.	.0	2960.	-6.0	500.	-9.0	230.	.0	1000.
5320.	659.	dmp5	w	.0	760.	10.0	1800.	.0	2960.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	500.	.0	1600.	-8.0	875.	.0	650.				
5320.	1000.	dmp5	w	.0	760.	10.0	1800.	.0	2960.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	500.	.0	1600.	-8.0	250.	.0	750.				
5300.	699.	dmp5	w	.0	750.	10.0	2000.	.0	2960.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	500.	.0	1600.	-8.0	250.	.0	750.				
5300.	1000.	dmp5	w	.0	750.	10.0	2000.	.0	2960.	-6.0	500.	-9.0	780.	.0	1600.
				.0	540.										
5280.	1577.	dmp5	w	.0	730.	10.0	2200.	.0	2960.	-6.0	500.	-9.0	780.	.0	1600.
				.0	540.										
5260.	1442.	dmp5	w	.0	1000.	10.0	2400.	.0	2960.	-6.0	500.	-9.0	780.	.0	1600.
				.0	540.										
5240.	615.	dmp5	w	.0	460.	10.0	2600.	.0	2960.	-6.0	500.	-9.0	780.	.0	1600.
				.0	540.										
5460.	660.	dmp3	w	.0	1100.	.0	250.	10.0	400.	.0	2960.	-6.0	500.	-9.0	230.
				.0	1000.										
5460.	332.	dmp3	w	.0	770.	10.0	400.	.0	2960.	-6.0	500.	-9.0	230.	.0	1000.
5440.	285.	dmp3	w	.0	1120.	10.0	200.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	230.	.0	1000.								
5440.	285.	dmp3	w	.0	440.	10.0	200.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	230.	.0	1000.								

Brohm Gilt Edge Project

Truck Profiles

Year 2

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
5240.	361.	mcr	m	.0	980.	10.0	3200.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5240.	41.	lstk	l	.0	980.	10.0	3200.	.0	450.	10.0	400.	.0	500.	10.0	200.
				.0	200.										
5220.	680.	mcr	m	.0	780.	10.0	1000.	.0	700.	10.0	2400.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5220.	58.	lstk	l	.0	780.	10.0	1000.	.0	700.	10.0	2400.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5200.	677.	mcr	m	.0	720.	10.0	1000.	.0	700.	10.0	2600.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5200.	46.	lstk	l	.0	720.	10.0	1000.	.0	700.	10.0	2600.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5180.	631.	mcr	m	.0	700.	10.0	1000.	.0	700.	10.0	2800.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5180.	35.	lstk	l	.0	700.	10.0	1000.	.0	700.	10.0	2800.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5160.	630.	mcr	m	.0	520.	10.0	1000.	.0	700.	10.0	3000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5160.	25.	lstk	l	.0	520.	10.0	1000.	.0	700.	10.0	3000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5140.	632.	mcr	m	.0	430.	10.0	1000.	.0	450.	10.0	3200.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5140.	19.	lstk	l	.0	430.	10.0	1000.	.0	950.	10.0	3200.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5120.	246.	mcr	m	.0	270.	10.0	1000.	.0	900.	10.0	3400.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5120.	7.	lstk	l	.0	270.	10.0	1000.	.0	900.	10.0	3400.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5440.	20.	mcr	m	.0	2040.	10.0	200.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5440.	16.	lstk	l	.0	2040.	10.0	200.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5420.	57.	mcr	m	.0	1780.	10.0	400.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5420.	53.	lstk	l	.0	1780.	10.0	400.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5420.	7.	mcr	m	.0	260.	10.0	400.	.0	300.	-8.0	250.	.0	750.	10.0	1200.
				.0	120.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5420.	6.	lstk	l	.0	260.	10.0	400.	.0	300.	-8.0	250.	.0	750.	10.0	1200.
				.0	120.	10.0	400.	.0	500.	10.0	200.	.0	200.		
5400.	71.	mcr	m	.0	1760.	10.0	600.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5400.	61.	lstk	l	.0	1760.	10.0	600.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5400.	7.	mcr	m	.0	100.	10.0	600.	.0	300.	-8.0	250.	.0	750.	10.0	1200.
				.0	120.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5400.	6.	lstk	l	.0	100.	10.0	600.	.0	300.	-8.0	250.	.0	750.	10.0	1200.
				.0	120.	10.0	400.	.0	500.	10.0	200.	.0	200.		
5380.	68.	mcr	m	.0	2100.	10.0	800.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5380.	76.	lstk	l	.0	2100.	10.0	800.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5360.	77.	mcr	m	.0	2440.	10.0	1000.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	1220.	6.0	500.	.0	380.						
5360.	100.	lstk	l	.0	2440.	10.0	1000.	.0	200.	10.0	1000.	.0	450.	10.0	400.
				.0	500.	10.0	200.	.0	200.						
5340.	102.	mcr	m	.0	2040.	10.0	200.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5340.	100.	lstk	l	.0	2040.	10.0	200.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	500.	10.0	200.	.0	200.		
5320.	118.	mcr	m	.0	2620.	10.0	400.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	200.		
5320.	97.	lstk	l	.0	2620.	10.0	400.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	500.	10.0	200.	.0	200.		
5300.	95.	mcr	m	.0	2700.	10.0	600.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	200.		
5300.	25.	lstk	l	.0	2700.	10.0	600.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	500.	10.0	200.	.0	200.		
5280.	83.	mcr	m	.0	1680.	10.0	800.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	200.		
5280.	16.	lstk	l	.0	1680.	10.0	800.	.0	250.	10.0	1000.	.0	200.	10.0	1000.
				.0	450.	10.0	400.	.0	500.	10.0	200.	.0	200.		
5240.	665.	fdam	w	.0	980.	10.0	2600.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.
				-5.0	500.	-10.0	650.	.0	2200.						
5440.	542.	fdam	w	.0	2040.	10.0	200.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.
				-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	650.	.0	2200.		
5220.	286.	fdam	w	.0	780.	10.0	1000.	.0	700.	10.0	1800.	.0	2960.	-6.0	500.
				-9.0	780.	.0	1900.	-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.
				-5.0	1000.	-10.0	500.	-5.0	500.	-10.0	650.	.0	2200.		
5220.	898.	cdam	w	.0	780.	10.0	1000.	.0	700.	10.0	1800.	.0	2960.	-6.0	500.
				-9.0	780.	.0	1900.	-6.0	4580.	-10.0	750.	.0	300.		
5420.	135.	cdam	w	.0	1780.	10.0	400.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	780.	.0	1900.	-6.0	4580.	-10.0	750.	.0	300.		
5420.	229.	dmp4	w	.0	1780.	10.0	400.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	2500.	.0	300.
5420.	798.	dmp4	w	.0	1780.	10.0	400.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	1875.	.0	680.
5200.	1059.	dmp4	w	.0	720.	10.0	1000.	.0	700.	10.0	2000.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	1250.	.0	340.
5180.	574.	dmp4	w	.0	700.	10.0	1000.	.0	700.	10.0	2200.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	1250.	.0	340.
5180.	414.	dmp4	w	.0	700.	10.0	1000.	.0	700.	10.0	2200.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	625.	.0	1000.
5160.	867.	dmp4	w	.0	520.	10.0	1000.	.0	700.	10.0	2400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	625.	.0	1000.
5140.	736.	dmp4	w	.0	430.	10.0	1000.	.0	450.	10.0	2600.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	625.	.0	1000.
5120.	264.	dmp4	w	.0	270.	10.0	1000.	.0	900.	10.0	2800.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	625.	.0	1000.
5400.	618.	dmp4	w	.0	1760.	10.0	600.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	-8.0	625.	.0	1000.
5400.	616.	dmp4	w	.0	1760.	10.0	600.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	.0	2040.		
5380.	1302.	dmp4	w	.0	2100.	10.0	800.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	.0	2040.		
5360.	1367.	dmp4	w	.0	2440.	10.0	1000.	.0	200.	10.0	400.	.0	2960.	-6.0	500.
				-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.	.0	2040.		
5340.	788.	dmp4	w	.0	2040.	10.0	200.	.0	250.	10.0	1000.	.0	200.	10.0	400.
				.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.	.0	2000.
				.0	2040.										
5340.	599.	dmp4	w	.0	2040.	10.0	200.	.0	250.	10.0	1000.	.0	200.	10.0	400.
				.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	1140.
5320.	1469.	dmp4	w	.0	2620.	10.0	400.	.0	250.	10.0	1000.	.0	200.	10.0	400.
				.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	1140.
5300.	1646.	dmp4	w	.0	2700.	10.0	600.	.0	250.	10.0	1000.	.0	200.	10.0	400.
				.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	1140.
5280.	1481.	dmp4	w	.0	1680.	10.0	800.	.0	250.	10.0	1000.	.0	200.	10.0	400.
				.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	1140.

Brohm Gilt Edge Project

Truck Profiles

Year 3

Bench	Rock Ktons	Destin -ation	Rock Type	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet	Grade	Feet
5120.	364.	mcr	m	.0	640.	10.0	1600.	.0	1620.	10.0	800.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5100.	559.	mcr	m	.0	560.	10.0	1600.	.0	2040.	10.0	1000.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5080.	549.	mcr	m	.0	700.	10.0	1600.	.0	2440.	10.0	1200.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5060.	466.	mcr	m	.0	600.	10.0	1600.	.0	2180.	10.0	1400.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5040.	420.	mcr	m	.0	540.	10.0	1600.	.0	1680.	10.0	1600.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5020.	362.	mcr	m	.0	520.	10.0	1600.	.0	1240.	10.0	1800.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5000.	326.	mcr	m	.0	340.	10.0	1600.	.0	640.	10.0	2000.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
4980.	27.	mcr	m	.0	200.	10.0	1600.	.0	340.	10.0	2200.	.0	250.	10.0	1200.
				8.0	500.	10.0	400.	.0	450.	10.0	400.	.0	1220.	6.0	500.
				.0	380.										
5280.	14.	mcr	m	.0	2100.	10.0	800.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5260.	113.	mcr	m	.0	1120.	10.0	1000.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5240.	128.	mcr	m	.0	1080.	10.0	1200.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5220.	176.	mcr	m	.0	980.	10.0	1400.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5200.	229.	mcr	m	.0	1060.	10.0	1600.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5180.	238.	mcr	m	.0	1300.	10.0	1800.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5160.	262.	mcr	m	.0	1280.	10.0	2000.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5140.	321.	mcr	m	.0	1120.	10.0	2200.	.0	250.	10.0	1200.	8.0	500.	10.0	400.
				.0	450.	10.0	400.	.0	1220.	6.0	500.	.0	380.		
5520.	2.	mcr	m	.0	800.	10.0	800.	.0	800.	6.0	500.	.0	380.		
5500.	6.	mcr	m	.0	680.	10.0	1000.	.0	800.	6.0	500.	.0	380.		
5120.	393.	dmp3	w	.0	640.	10.0	1600.	.0	1620.	10.0	800.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	.0	1250.						
5100.	39.	dmp2	w	.0	560.	10.0	1600.	.0	2040.	10.0	1000.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1000.	-8.0	1875.	.0	300.						
5080.	504.	dmp2	w	.0	700.	10.0	1600.	.0	2440.	10.0	1200.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1000.	-8.0	625.	.0	1450.						
5100.	282.	dmp2	w	.0	560.	10.0	1600.	.0	2040.	10.0	1000.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1000.	-8.0	1250.	.0	600.						
5100.	281.	dmp2	w	.0	560.	10.0	1600.	.0	2040.	10.0	1000.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1000.	-8.0	625.	.0	1450.						
5060.	459.	dmp2	w	.0	600.	10.0	1600.	.0	2180.	10.0	1400.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1300.										
5040.	408.	dmp2	w	.0	540.	10.0	1600.	.0	1680.	10.0	1600.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1300.										
5020.	372.	dmp2	w	.0	520.	10.0	1600.	.0	1240.	10.0	1800.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1300.										
5000.	290.	dmp2	w	.0	340.	10.0	1600.	.0	640.	10.0	2000.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1300.										
4980.	25.	dmp2	w	.0	200.	10.0	1600.	.0	340.	10.0	2200.	.0	250.	10.0	1200.
				8.0	250.	.0	2960.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1875.
				.0	1300.										
5280.	247.	dmp2	w	.0	2100.	10.0	800.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	800.		
5260.	1714.	dmp2	w	.0	1120.	10.0	1000.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	800.		
5240.	1747.	dmp2	w	.0	1080.	10.0	1200.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	1250.	.0	800.		
5220.	1662.	dmp2	w	.0	980.	10.0	1400.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.	.0	800.		
5200.	1572.	dmp2	w	.0	1060.	10.0	1600.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.	.0	800.		
5180.	903.	dmp2	w	.0	1300.	10.0	1800.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.	.0	800.		
5180.	624.	dmp4	w	.0	1300.	10.0	1800.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.	.0	1580.		
5160.	1474.	dmp4	w	.0	1280.	10.0	2000.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.	.0	1580.		
5140.	1379.	dmp4	w	.0	1120.	10.0	2200.	.0	250.	10.0	1200.	8.0	250.	.0	2960.
				-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.	.0	1580.		
5540.	691.	dmp4	w	.0	600.	-10.0	400.	.0	2000.	-6.0	500.	-9.0	400.	-5.0	700.
				-8.0	625.	.0	1580.								
5520.	1191.	dmp4	w	.0	620.	-10.0	200.	.0	2000.	-6.0	500.	-9.0	400.	-5.0	700.
				-8.0	625.	.0	1580.								
5500.	653.	dmp4	w	.0	510.	.0	2000.	-6.0	500.	-9.0	400.	-5.0	700.	-8.0	625.
				.0	1580.										
5620.	5.	fdam	w	.0	220.	-10.0	1200.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.
				-5.0	500.	-10.0	350.	.0	2000.						
5600.	15.	fdam	w	.0	500.	-10.0	1000.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.
				-5.0	500.	-10.0	350.	.0	2000.						
5580.	103.	fdam	w	.0	300.	-10.0	800.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.
				-5.0	500.	-10.0	350.	.0	2000.						
5580.	103.	fdam	w	.0	450.	-10.0	800.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.
				-5.0	500.	-10.0	350.	.0	2000.						
5560.	528.	fdam	w	.0	350.	-10.0	600.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	2916.	.0	2380.	-5.0	2500.	-10.0	500.	-5.0	1000.	-10.0	500.
				-5.0	500.	-10.0	350.	.0	2000.						
5560.	191.	cdam	w	.0	350.	-10.0	600.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	4582.	-6.0	666.	.0	100.						
5540.	282.	cdam	w	.0	600.	-10.0	400.	.0	2000.	-6.0	500.	-9.0	780.	.0	1900.
				-6.0	4582.	-6.0	666.	.0	100.						

APPENDIX B

A P P E N D I X   B

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Prep

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
5620.	1.	l lstk	3.56	8.46	41.3	3745.3	.3
5600.	25.	l lstk	3.38	8.28	42.3	3828.9	6.5
5580.	25.	l lstk	3.54	8.44	41.5	3758.1	6.7
5560.	29.	l lstk	3.19	8.09	43.2	3917.1	7.4
5540.	46.	l lstk	3.66	8.56	40.9	3702.7	12.4
5520.	51.	l lstk	4.06	8.96	39.0	3536.7	14.4
5500.	49.	l lstk	4.62	9.52	36.8	3329.9	14.7
5480.	46.	l lstk	5.04	9.94	35.2	3189.2	14.4
5460.	5.	m mcr	6.94	11.84	29.6	2780.5	1.8
5460.	56.	l lstk	5.69	10.59	33.1	2995.0	18.7
5440.	5.	m mcr	7.52	12.42	28.2	2651.0	1.9
5440.	33.	l lstk	6.26	11.16	31.4	2841.5	11.6
5420.	40.	m mcr	8.34	13.24	26.4	2487.8	16.1
5420.	37.	l lstk	7.07	11.97	29.2	2648.9	14.0
5560.	8.	l lstk	2.94	7.84	44.7	4044.5	2.0
5540.	4.	m mcr	4.42	9.32	37.6	3533.3	1.1
5540.	19.	l lstk	3.25	8.15	42.9	3888.1	4.9
5520.	4.	m mcr	5.31	10.21	34.3	3226.6	1.2
5520.	26.	l lstk	4.13	9.03	38.8	3512.5	7.4
5500.	6.	m mcr	5.93	10.83	32.3	3041.7	2.0
5500.	36.	l lstk	4.67	9.57	36.6	3313.9	10.9
5480.	11.	m mcr	6.34	11.24	31.1	2930.4	3.8
5480.	43.	l lstk	5.08	9.98	35.1	3178.2	13.5
5620.	7.	w fill1	3.96	8.86	39.5	3686.0	1.9
5600.	167.	w fill1	3.72	8.62	40.6	3786.0	44.1
5580.	303.	w fill1	3.87	8.77	39.9	3721.5	81.4
5560.	405.	w fill1	3.88	8.78	39.8	3717.1	109.0
5540.	58.	w fill1	4.26	9.16	38.2	3565.1	16.3
5540.	202.	w fill2	5.23	10.13	34.5	3222.3	62.7
5540.	192.	w fill3	6.37	11.27	31.1	2897.6	66.3
5520.	568.	w fill3	6.77	11.67	30.0	2797.0	203.1
5500.	602.	w fill3	7.33	12.23	28.6	2669.7	225.5
5480.	494.	w fill3	7.76	12.66	27.6	2579.3	191.5
5480.	151.	w fill4	8.51	13.41	26.1	2435.0	62.0
5460.	765.	w fill4	9.16	14.06	24.9	2323.0	329.3
5440.	838.	w fill4	9.74	14.64	23.9	2230.1	375.8
5420.	905.	w fill4	10.54	15.44	22.7	2114.2	428.1
5640.	10.	w fill4	9.00	13.90	25.2	2349.7	4.3
5620.	50.	w fill4	8.69	13.59	25.8	2403.3	20.8
5600.	55.	w fill4	8.41	13.31	26.3	2452.8	22.4
5600.	37.	w fill4	6.34	11.24	31.1	2904.7	12.7
5580.	104.	w fill4	8.13	13.03	26.9	2505.7	41.5
5580.	123.	w fill4	6.51	11.41	30.7	2860.9	43.0
5580.	85.	w cdam	12.76	17.66	19.8	1849.1	46.0
5560.	201.	w cdam	14.07	18.97	18.5	1721.3	116.8
5560.	201.	w cdam	12.67	17.57	19.9	1858.1	108.2
5560.	43.	w cdam	12.67	17.57	19.9	1858.1	23.1
5540.	207.	w cdam	13.83	18.73	18.7	1743.4	118.7
5540.	247.	w cdam	12.95	17.85	19.6	1829.5	135.0
5540.	63.	w fdam	19.96	24.86	14.1	1313.5	48.0
5520.	210.	w fdam	20.65	25.55	13.7	1278.0	164.3
5520.	214.	w fdam	20.63	25.53	13.7	1279.2	167.3
5520.	205.	w fdam	20.63	25.53	13.7	1279.2	160.3
5500.	257.	w fdam	20.49	25.39	13.8	1285.9	199.9
5500.	515.	w fdam	19.15	24.05	14.6	1357.7	379.3
5480.	229.	w fdam	20.28	25.18	13.9	1296.5	176.6
5480.	59.	w dmp3	7.44	12.34	28.4	2645.7	22.3
5480.	428.	w dmp3	6.71	11.61	30.1	2812.5	152.2
5480.	150.	w dmp3	6.71	11.61	30.1	2812.5	53.3

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	75.	7.33	12.23	28.6	2691.9	27.9
Leach	530.	4.66	9.56	36.6	3317.2	159.8
waste	9350.	10.51	15.41	22.7	2118.8	4412.8
Total	9955.	10.17	15.07	23.2	2163.9	4600.5

Average Fuel Consumption 23.55 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 1

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
5400.	154.	m mcr	8.50	13.40	26.1	2457.7	62.7
5400.	64.	l lstk	7.20	12.10	28.9	2619.2	24.4
5380.	218.	m mcr	9.59	14.49	24.2	2272.4	95.9
5360.	83.	l lstk	8.31	13.21	26.5	2399.6	34.6
5360.	289.	m mcr	9.40	14.30	24.5	2303.1	125.5
5360.	67.	l lstk	8.09	12.99	26.9	2440.5	27.5
5340.	410.	m mcr	9.79	14.69	23.8	2241.1	182.9
5340.	99.	l lstk	8.50	13.40	26.1	2365.1	41.9
5320.	497.	m mcr	10.15	15.05	23.3	2188.6	227.1
5320.	109.	l lstk	8.87	13.77	25.4	2303.0	47.3
5300.	566.	m mcr	10.61	15.51	22.6	2123.7	266.5
5300.	91.	l lstk	9.32	14.22	24.6	2229.8	40.8
5280.	640.	m mcr	11.06	15.96	21.9	2062.9	310.2
5280.	111.	l lstk	9.78	14.68	23.8	2160.3	51.4
5260.	683.	m mcr	11.74	16.64	21.0	1978.5	345.2
5260.	87.	l lstk	10.45	15.35	22.8	2064.8	42.1
5240.	341.	m mcr	11.81	16.71	20.9	1970.5	173.1
5240.	34.	l lstk	10.52	15.42	22.7	2056.3	16.5
5460.	15.	m mcr	7.24	12.14	28.8	2713.4	5.5
5460.	40.	l lstk	5.96	10.86	32.2	2919.1	13.7
5460.	5.	m mcr	6.79	11.69	29.9	2817.1	1.8
5460.	13.	l lstk	5.52	10.42	33.6	3043.1	4.3
5440.	10.	m mcr	7.69	12.59	27.8	2615.1	3.8
5440.	9.	l lstk	6.42	11.32	30.9	2801.2	3.2
5440.	11.	m mcr	7.18	12.08	29.0	2725.0	4.0
5440.	7.	l lstk	5.92	10.82	32.4	2931.4	2.4
5360.	120.	m mcr	9.55	14.45	24.2	2279.2	52.7
5360.	218.	m mcr	8.17	13.07	26.8	2520.1	86.5
5600.	387.	m mcr	2.17	7.07	49.5	4659.2	83.1
5400.	1037.	w dmp1	11.34	16.24	21.5	2010.4	515.8
5380.	1141.	w dmp3	9.55	14.45	24.2	2259.3	505.0
5360.	1240.	w dmp3	8.45	13.35	26.2	2446.3	506.9
5340.	1528.	w dmp3	8.84	13.74	25.5	2375.8	643.1
5320.	659.	w dmp5	13.57	18.47	18.9	1767.6	372.8
5320.	1000.	w dmp5	12.96	17.86	19.6	1828.2	547.0
5300.	699.	w dmp5	13.42	18.32	19.1	1782.3	392.2
5300.	1000.	w dmp5	11.23	16.13	21.7	2024.8	493.9
5280.	1577.	w dmp5	11.68	16.58	21.1	1969.0	800.9
5260.	1442.	w dmp5	12.36	17.26	20.3	1891.4	762.4
5240.	615.	w dmp5	12.43	17.33	20.2	1883.9	326.5
5460.	660.	w dmp3	6.30	11.20	31.3	2916.6	226.3
5460.	332.	w dmp3	5.85	10.75	32.6	3037.9	109.3
5440.	285.	w dmp3	6.75	11.65	30.0	2803.1	101.7
5440.	285.	w dmp3	6.24	11.14	31.4	2930.9	97.2

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4564.	9.72	14.62	23.9	2252.1	2026.5
Leach	814.	8.74	13.64	25.7	2325.0	350.1
waste	13500.	10.58	15.48	22.6	2109.0	6401.0
Total	18878.	10.29	15.19	23.0	2150.7	8777.6

Average Fuel Consumption 25.29 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 2

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
5240.	361.	m mcr	12.22	17.12	20.4	1923.5	187.7
5240.	41.	l lstk	10.92	15.82	22.1	2003.8	20.5
5220.	680.	m mcr	13.14	18.04	19.4	1825.0	372.6
5220.	58.	l lstk	11.75	16.65	21.0	1904.5	30.5
5200.	677.	m mcr	13.57	18.47	19.0	1783.1	379.7
5200.	46.	l lstk	12.17	17.07	20.5	1857.1	24.8
5180.	631.	m mcr	14.03	18.93	18.5	1739.4	362.8
5180.	35.	l lstk	12.64	17.54	20.0	1808.0	19.4
5160.	630.	m mcr	14.38	19.28	18.2	1708.2	368.8
5160.	25.	l lstk	12.97	17.87	19.6	1773.7	14.1
5140.	632.	m mcr	14.57	19.47	18.0	1690.9	373.8
5140.	19.	l lstk	13.55	18.45	19.0	1718.1	11.1
5120.	246.	m mcr	15.29	20.19	17.3	1631.0	150.8
5120.	7.	l lstk	13.89	18.79	18.6	1687.5	4.1
5440.	20.	m mcr	8.39	13.29	26.3	2477.6	8.1
5440.	16.	l lstk	7.10	12.00	29.2	2641.4	6.1
5420.	57.	m mcr	8.68	13.58	25.8	2424.2	23.5
5420.	53.	l lstk	7.39	12.29	28.5	2579.4	20.5
5420.	7.	m mcr	8.49	13.39	26.1	2458.5	2.8
5420.	6.	l lstk	7.13	12.03	29.1	2636.0	2.3
5400.	71.	m mcr	9.19	14.09	24.8	2337.3	30.4
5400.	61.	l lstk	7.81	12.71	27.5	2494.4	24.5
5400.	7.	m mcr	8.87	13.77	25.4	2391.6	2.9
5400.	6.	l lstk	7.50	12.40	28.2	2557.2	2.3
5380.	68.	m mcr	9.92	14.82	23.6	2221.9	30.6
5380.	76.	l lstk	8.53	13.43	26.1	2360.0	32.2
5360.	77.	m mcr	10.66	15.56	22.5	2116.2	36.4
5360.	100.	l lstk	9.27	14.17	24.7	2237.1	44.7
5340.	102.	m mcr	11.03	15.93	22.0	2067.1	49.3
5340.	100.	l lstk	9.63	14.53	24.1	2181.2	45.8
5320.	118.	m mcr	11.72	16.62	21.1	1980.7	59.6
5320.	97.	l lstk	10.53	15.43	22.7	2054.5	47.2
5300.	95.	m mcr	12.35	17.25	20.3	1909.2	49.8
5300.	25.	l lstk	11.06	15.96	21.9	1986.5	12.6
5280.	83.	m mcr	12.04	16.94	20.7	1943.8	42.7
5280.	16.	l lstk	10.75	15.65	22.4	2025.3	7.9
5240.	665.	w fdam	24.14	29.04	12.1	1124.4	591.4
5440.	542.	w fdam	21.06*	25.96	13.5	1257.8	430.9
5220.	286.	w fdam	25.73	30.63	11.4	1066.1	268.3
5220.	898.	w cdam	19.28	24.18	14.5	1350.5	664.9
5420.	135.	w cdam	14.91	19.81	17.7	1648.4	81.9
5420.	229.	w dmp4	14.32	19.22	18.2	1699.0	134.8
5420.	798.	w dmp4	13.89	18.79	18.6	1737.8	459.2
5200.	1059.	w dmp4	17.75	22.65	15.5	1441.5	734.6
5180.	574.	w dmp4	18.22	23.12	15.1	1412.1	406.5
5180.	414.	w dmp4	17.98	22.88	15.3	1426.8	290.2
5160.	867.	w dmp4	18.32	23.22	15.1	1406.1	616.6
5140.	736.	w dmp4	18.52	23.42	14.9	1394.2	527.9
5120.	264.	w dmp4	19.24	24.14	14.5	1352.4	195.2
5400.	618.	w dmp4	13.14	18.04	19.4	1809.9	341.5
5400.	616.	w dmp4	13.32	18.22	19.2	1791.9	343.8
5380.	1302.	w dmp4	14.06	18.96	18.5	1722.1	756.1
5360.	1367.	w dmp4	14.80	19.70	17.8	1657.4	824.8
5340.	788.	w dmp4	15.16	20.06	17.4	1627.7	484.1
5340.	599.	w dmp4	12.27	17.17	20.4	1901.9	314.9
5320.	1469.	w dmp4	13.18	18.08	19.4	1806.0	813.4
5300.	1646.	w dmp4	13.71	18.61	18.8	1754.4	938.2
5280.	1481.	w dmp4	13.40	18.30	19.1	1783.8	830.3

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	13.38	18.28	19.1	1801.6	2532.2
Leach	787.	10.02	14.92	23.5	2124.3	370.5
waste	17353.	15.89	20.79	16.8	1570.5	11049.4
Total	22702.	15.18	20.08	17.4	1627.1	13952.1

Average Fuel Consumption 26.81 US Gallons/Operating Hour

INDEPENDENT
MINING CONSULTANTS, INC.

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 3

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
5120.	364.	m mcr	16.43	21.33	16.4	1543.7	235.8
5100.	559.	m mcr	17.16	22.06	15.9	1492.4	374.6
5080.	549.	m mcr	18.05	22.95	15.3	1434.9	382.6
5060.	466.	m mcr	18.27	23.17	15.1	1420.9	328.0
5040.	420.	m mcr	18.31	23.21	15.1	1418.6	296.1
5020.	362.	m mcr	18.45	23.35	15.0	1410.0	256.7
5000.	326.	m mcr	18.33	23.23	15.1	1417.4	230.0
4980.	27.	m mcr	18.48	23.38	15.0	1408.7	19.2
5280.	14.	m mcr	12.42	17.32	20.2	1901.5	7.4
5260.	113.	m mcr	12.16	17.06	20.5	1930.6	58.5
5240.	128.	m mcr	12.62	17.52	20.0	1879.8	68.1
5220.	176.	m mcr	13.02	17.92	19.5	1837.0	95.8
5200.	229.	m mcr	13.57	18.47	19.0	1783.3	128.4
5180.	238.	m mcr	14.19	19.09	18.3	1724.5	138.0
5160.	262.	m mcr	14.67	19.57	17.9	1682.2	155.7
5140.	321.	m mcr	15.01	19.91	17.6	1653.9	194.1
5520.	2.	m mcr	4.63	9.53	36.7	3453.5	.6
5500.	6.	m mcr	5.04	9.94	35.2	3314.2	1.8
5120.	393.	w dmp3	14.67	19.57	17.9	1668.5	235.5
5100.	39.	w dmp2	21.09	25.99	13.5	1256.1	31.0
5080.	504.	w dmp2	21.41	26.31	13.3	1241.0	406.1
5100.	282.	w dmp2	20.60	25.50	13.7	1280.2	220.3
5100.	281.	w dmp2	20.52	25.42	13.8	1284.6	218.8
5060.	459.	w dmp2	20.15	25.05	14.0	1303.6	352.1
5040.	408.	w dmp2	20.19	25.09	13.9	1301.2	313.6
5020.	372.	w dmp2	20.33	25.23	13.9	1294.3	287.4
5000.	290.	w dmp2	20.21	25.11	13.9	1300.4	223.0
4980.	25.	w dmp2	20.35	25.25	13.9	1293.0	19.3
5280.	247.	w dmp2	13.35	18.25	19.2	1789.4	138.0
5260.	1714.	w dmp2	13.08	17.98	19.5	1816.0	943.8
5240.	1747.	w dmp2	13.55	18.45	19.0	1769.8	987.1
5220.	1662.	w dmp2	13.25	18.15	19.3	1798.7	924.0
5200.	1572.	w dmp2	13.79	18.69	18.7	1746.7	900.0
5180.	903.	w dmp2	14.42	19.32	18.1	1689.9	534.4
5180.	624.	w dmp4	14.98	19.88	17.6	1642.7	379.9
5160.	1474.	w dmp4	15.46	20.36	17.2	1604.0	918.9
5140.	1379.	w dmp4	15.79	20.69	16.9	1578.0	873.9
5540.	691.	w dmp4	6.52	11.42	30.7	2860.3	241.6
5520.	1191.	w dmp4	6.28	11.18	31.3	2919.7	407.9
5500.	653.	w dmp4	5.86	10.76	32.5	3034.9	215.2
5620.	5.	w fdam	18.44*	23.34	15.0	1399.0	3.6
5600.	15.	w fdam	18.45*	23.35	15.0	1398.2	10.7
5580.	103.	w fdam	17.92*	22.82	15.3	1431.0	72.0
5580.	103.	w fdam	18.07*	22.97	15.2	1421.3	72.5
5560.	528.	w fdam	17.68*	22.58	15.5	1446.3	365.1
5560.	191.	w cdam	11.15	16.05	21.8	2034.1	93.9
5540.	282.	w cdam	11.10	16.00	21.9	2040.2	138.2

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	16.55	21.45	16.3	1535.3	2971.4
Leach	0.	.00	.00	.0	.0	.0
waste	18137.	14.05	18.95	18.5	1722.8	10527.8
Total	22699.	14.55	19.45	18.0	1681.5	13499.2

Average Fuel Consumption 26.95 US Gallons/Operating Hour

INDEPENDENT
MINING CONSULTANTS, INC.

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 4

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
4960.	505.	m mcr	19.80	24.70	14.2	1332.9	378.9
4920.	297.	m mcr	20.33	25.23	13.9	1305.0	227.6
4880.	119.	m mcr	21.41	26.31	13.3	1251.7	95.1
5100.	796.	m mcr	16.58	21.48	16.3	1532.8	519.3
5060.	1035.	m mcr	17.56	22.46	15.6	1465.9	706.1
5020.	1204.	m mcr	18.35	23.25	15.1	1416.0	850.3
5000.	322.	m mcr	18.74	23.64	14.8	1392.8	231.2
5480.	20.	m mcr	5.55	10.45	33.5	3152.5	6.3
5440.	84.	m mcr	6.66	11.56	30.3	2849.4	29.5
5400.	129.	m mcr	7.92	12.82	27.3	2568.0	50.2
5380.	51.	m mcr	8.40	13.30	26.3	2475.5	20.6
4960.	404.	w dmp6	20.89	25.79	13.6	1266.2	319.1
4920.	324.	w dmp6	21.30	26.20	13.4	1246.3	260.0
4880.	189.	w dmp6	22.39	27.29	12.8	1196.5	158.0
5100.	2372.	w dmp6	17.75	22.65	15.5	1441.6	1645.4
5060.	1956.	w dmp6	18.61	23.51	14.9	1389.0	1408.2
5020.	1603.	w dmp6	18.05	22.95	15.3	1422.7	1126.7
5000.	292.	w dmp6	17.95	22.85	15.3	1428.8	204.4
5480.	950.	w fdam	24.48*	29.38	11.9	1111.4	854.8
5480.	595.	w cdam	17.99	22.89	15.3	1426.7	417.0
5480.	561.	w dmp6	7.40	12.30	28.5	2655.5	211.3
5440.	3198.	w dmp6	8.49	13.39	26.1	2438.4	1311.5
5400.	3785.	w dmp6	9.76	14.66	23.9	2227.9	1698.9
5380.	1909.	w dmp6	10.23	15.13	23.1	2157.4	884.9

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	17.58	22.48	15.6	1464.5	3115.0
Leach	0.	.00	.00	.0	.0	.0
waste	18138.	14.00	18.90	18.5	1727.4	10500.0
Total	22700.	14.72	19.62	17.8	1667.3	13615.0

Average Fuel Consumption 27.36 US Gallons/Operating Hour

* Profile Exceeds Tire Ton-Mph Rating of 430.
Based on Ambient 100-deg Farenheit.

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 5

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
5000.	392.	m mcr	18.74	23.64	14.8	1392.8	281.4
4960.	1588.	m mcr	19.48	24.38	14.4	1350.7	1175.7
4920.	1148.	m mcr	19.88	24.78	14.1	1328.7	864.0
4880.	583.	m mcr	20.95	25.85	13.5	1274.1	457.6
5360.	78.	m mcr	8.88	13.78	25.4	2389.7	32.6
5320.	166.	m mcr	9.72	14.62	23.9	2252.6	73.7
5280.	296.	m mcr	10.51	15.41	22.7	2136.4	138.6
5240.	311.	m mcr	11.60	16.50	21.2	1995.7	155.8
5000.	351.	w dmp6	17.95	22.85	15.3	1428.8	245.7
4960.	981.	w dmp6	18.66	23.56	14.9	1385.9	707.8
4920.	510.	w dmp6	19.07	23.97	14.6	1362.1	374.4
4880.	354.	w dmp6	20.13	25.03	14.0	1304.6	271.4
5360.	1173.	w fdam	24.02	28.92	12.1	1129.1	1038.9
5360.	735.	w cdam	18.64	23.54	14.9	1387.2	529.8
5360.	539.	w dmp6	8.26	13.16	26.6	2480.3	217.3
5320.	4830.	w dmp6	8.31	13.21	26.5	2471.2	1954.5
5280.	5087.	w dmp6	9.10	14.00	25.0	2331.8	2181.6
5240.	3581.	w dmp6	10.19	15.09	23.2	2164.5	1654.5

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	18.05	22.95	15.3	1434.8	3179.5
Leach	0.	.00	.00	.0	.0	.0
waste	18141.	11.62	16.52	21.2	1977.0	9175.9
Total	22703.	12.90	17.80	19.7	1837.5	12355.3

Average Fuel Consumption 26.60 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 6

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
4880.	329.	m mcr	21.44	26.34	13.3	1250.3	263.1
4840.	725.	m mcr	22.04	26.94	13.0	1222.4	593.1
4800.	492.	m mcr	22.96	27.86	12.6	1181.9	416.3
4760.	315.	m mcr	23.52	28.42	12.3	1158.5	271.9
4720.	148.	m mcr	24.27	29.17	12.0	1129.0	131.1
5240.	127.	m mcr	11.74	16.64	21.0	1979.3	64.2
5200.	540.	m mcr	12.63	17.53	20.0	1878.6	287.4
5160.	670.	m mcr	13.57	18.47	18.9	1782.5	375.9
5120.	802.	m mcr	14.44	19.34	18.1	1702.6	471.0
5100.	414.	m mcr	15.03	19.93	17.6	1652.2	250.6
4880.	249.	w dmp6	21.49	26.39	13.3	1237.5	201.2
4840.	680.	w dmp6	22.01	26.91	13.0	1213.5	560.4
4800.	551.	w dmp6	23.02	27.92	12.5	1169.6	471.1
4760.	382.	w dmp6	23.58	28.48	12.3	1146.4	333.2
4720.	218.	w dmp6	24.32	29.22	12.0	1117.6	195.1
5240.	187.	w fdam	26.91	31.81	11.0	1026.5	182.2
5240.	117.	w cdam	21.53	26.43	13.2	1235.5	94.7
5240.	1085.	w dmp6	11.96	16.86	20.8	1936.1	560.4
5200.	4709.	w dmp6	12.77	17.67	19.8	1847.4	2549.0
5160.	4346.	w dmp6	13.73	18.63	18.8	1752.9	2479.4
5120.	4019.	w dmp6	14.59	19.49	18.0	1675.6	2398.5
5100.	1604.	w dmp6	15.18	20.08	17.4	1626.3	986.3

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	17.65	22.55	15.5	1460.0	3124.6
Leach	0.	.00	.00	.0	.0	.0
waste	18147.	14.91	19.81	17.7	1648.0	11011.4
Total	22709.	15.46	20.36	17.2	1606.5	14136.0

Average Fuel Consumption 27.84 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 7

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
5100.	66.	m mcr	15.03	19.93	17.6	1652.2	39.9
5060.	972.	m mcr	16.02	20.92	16.7	1573.6	617.7
5020.	1188.	m mcr	17.19	22.09	15.8	1490.7	796.9
4980.	1295.	m mcr	18.47	23.37	15.0	1408.9	919.2
4940.	1041.	m mcr	20.17	25.07	14.0	1313.6	792.5
5100.	258.	w dmp6	14.02	18.92	18.5	1725.9	149.5
5060.	3529.	w dmp6	15.01	19.91	17.6	1639.7	2152.2
5020.	3059.	w dmp6	16.18	21.08	16.6	1549.3	1974.5
4980.	2672.	w dmp6	17.45	22.35	15.7	1460.9	1829.0
4940.	1718.	w dmp6	19.15	24.05	14.6	1357.5	1265.5

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	17.95	22.85	15.3	1440.8	3166.2
Leach	0.	.00	.00	.0	.0	.0
waste	11236.	16.52	21.42	16.3	1524.4	7370.6
Total	15798.	16.93	21.83	16.0	1499.3	10536.9

Average Fuel Consumption 28.13 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 8

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
4940.	548.	m mcr	19.92	24.82	14.1	1326.5	413.1
4900.	1775.	m mcr	20.58	25.48	13.7	1292.4	1373.4
4860.	1684.	m mcr	21.01	25.91	13.5	1271.0	1325.0
4840.	555.	m mcr	21.27	26.17	13.4	1258.4	441.0
4940.	765.	w dmp6	18.90	23.80	14.7	1371.9	557.6
4900.	2390.	w dmp6	19.56	24.46	14.3	1334.7	1790.7
4860.	2152.	w dmp6	19.99	24.89	14.1	1312.0	1640.2
4840.	686.	w dmp6	20.25	25.15	13.9	1298.5	528.3

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	20.74	25.64	13.6	1284.2	3552.5
Leach	0.	.00	.00	.0	.0	.0
waste	5993.	19.71	24.61	14.2	1326.8	4516.8
Total	10555.	20.15	25.05	14.0	1308.0	8069.4

Average Fuel Consumption 28.91 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 9

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
4840.	256.	m mcr	21.77	26.67	13.1	1234.9	207.3
4800.	1542.	m mcr	22.33	27.23	12.9	1209.2	1275.3
4760.	1367.	m mcr	22.83	27.73	12.6	1187.4	1151.3
4720.	1156.	m mcr	23.77	28.67	12.2	1148.6	1006.4
4700.	241.	m mcr	24.21	29.11	12.0	1131.3	213.0
4840.	310.	w dmp6	24.32	29.22	12.0	1117.3	277.4
4800.	1819.	w dmp6	24.89	29.79	11.7	1096.1	1659.6
4760.	1668.	w dmp6	25.39	30.29	11.6	1077.9	1547.4
4720.	1519.	w dmp6	26.33	31.23	11.2	1045.7	1452.7
4700.	293.	w dmp6	26.76	31.66	11.1	1031.2	284.1

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	4562.	22.91	27.81	12.6	1183.9	3853.3
Leach	0.	.00	.00	.0	.0	.0
waste	5609.	25.49	30.39	11.5	1074.3	5221.3
Total	10171.	24.34	29.24	12.0	1120.8	9074.6

Average Fuel Consumption 29.42 US Gallons/Operating Hour

Brohm Gilt Edge Project

85 st Truck Loaded by 13.5 yd Shovel Productivity

Based on Simulation

Year 10

Individual Profile Results:

Bench	Ktons	Type & Destin -ation	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tons/ Truck-Shift	Required Shifts
4700.	319.	m mcr	24.21	29.11	12.0	1131.3	282.0
4660.	857.	m mcr	25.11	30.01	11.7	1097.4	780.9
4620.	516.	m mcr	26.01	30.91	11.3	1065.3	484.4
4580.	186.	m mcr	26.86	31.76	11.0	1036.7	179.4
4700.	387.	w dmp6	26.76	31.66	11.1	1031.2	375.3
4660.	1026.	w dmp6	27.66	32.56	10.7	1002.7	1023.3
4620.	639.	w dmp6	28.56	33.46	10.5	975.8	654.8
4580.	343.	w dmp6	29.41	34.31	10.2	951.6	360.4

Summary by Material Type:

Type	Ktonnes	Haul Time (min)	Cycle Time (min)	Trips/ Shift	Tonnes/ Truck-Shift	Required Shifts
mill	1878.	25.37	30.27	11.6	1087.6	1726.7
Leach	0.	.00	.00	.0	.0	.0
waste	2395.	28.01	32.91	10.6	992.2	2413.8
Total	4273.	26.86	31.76	11.0	1032.0	4140.5

Average Fuel Consumption 29.71 US Gallons/Operating Hour

INDEPENDENT
MINING CONSULTANTS, INC.

7.0 MINE PERSONNEL

7.0 MINE PERSONNEL REQUIREMENTS

Mine operating personnel requirements were established from the mine production schedule discussed in Section 4 and the mine equipment requirements described in Section 6.

Table 7-1 illustrates hourly-paid personnel requirements, which are derived from the work schedule for hourly personnel shown on Table 9-2. This work schedule, along with the equipment operating requirements, was used to establish the number of equipment operators and other mine operations personnel. The number of auxiliary equipment operators was established to maintain the mine in good working order and to ensure maximum production from the major mining equipment. A sufficient number of blasting crew personnel and laborers ensured that blasting requirements and general mine support tasks were covered.

Maintenance labor personnel requirements were fixed so as to maintain a rough 50% ratio of maintenance personnel to mine personnel. This ratio is low when compared with U.S. practices of ten years ago, but recent advances in componentized maintenance and vendor support now permit maintenance to be performed with fewer people. As a result, the maintenance staff recommended for Gilt Edge, which is summarized on Table 7-1, is typical of other western precious metal operations.

The salaried staff requirements are summarized on Table 7-2. Salaried mine staff include mine engineering and geology personnel. Salaried staff costs are the major component of the G&A portion of the mine operating costs discussed in Section 9.

Table 7-1

Brohm Gilt Edge Project
Hourly Labor Requirements

Job	Prep	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Mine Operations:											
Driller	3	8	9	9	9	10	9	6	4	4	3
Air Track Operator	1	2	2	1	1	1	1	1	1	1	1
Shovel Operator	3	8	9	9	9	9	9	7	4	4	4
Loader Operator	1	2	2	2	2	2	2	2	2	2	1
Truck Driver	11	34	53	52	52	47	54	40	31	35	32
Dozer (370 nhp) Opr	3	5	6	5	5	5	5	5	5	5	5
Dozer (285 nhp) Opr	2	3	3	3	3	3	3	3	3	3	3
Dozer (165 nhp) Opr	1	2	2	2	2	2	2	2	2	2	2
Tire Dozer Operator	4	8	9	9	9	9	9	8	8	8	8
Water Truck Operator	2	4	6	5	5	5	5	4	3	3	3
Grader Operator	2	4	6	5	6	5	5	3	3	3	3
Rock Breaker Operator	1	1	1	1	1	1	1	1	1	1	1
Blasting Crew	2	2	2	2	2	2	2	2	2	2	2
General Laborer	3	3	3	3	3	3	3	3	3	3	3
Subtotal	39	86	113	108	109	104	110	87	72	76	71
Mine Maintenance:											
Mechanic	7	16	22	22	22	22	22	17	15	15	14
Mechanic Helper	3	8	10	10	10	10	10	8	7	7	6
Welder	4	10	12	12	12	12	12	9	8	8	7
Electrician	2	4	5	5	5	5	5	4	3	3	3
Fuel & Lube Man	2	3	3	3	3	3	3	3	3	3	3
Tire Man	1	2	2	2	2	2	2	2	2	2	2
Subtotal	19	43	54	54	54	54	54	43	38	38	35
Total Hourly Labor	58	129	167	162	163	158	164	130	110	114	106

Note: The cost of additional hourly people to cover vacations, sickness, and absenteeism is included in the 39 percent fringe benefits.

Table 7-2

Brohm Gilt Edge Project

Salaried Staff Requirements

Job Title	Prep	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10
Mine Superintendent	1	1	1	1	1	1	1	1	1	1	1
Mine General Foreman	1	1	1	1	1	1	1	1	1	1	1
Mine Clerk	1	1	1	1	1	1	1	1	1	1	1
Mine Shift Foreman	2	4	4	4	4	4	4	4	4	4	4
Drill-Blast Foreman	1	1	1	1	1	1	1	1	1	1	1
Maintenance Foreman	1	1	1	1	1	1	1	1	1	1	1
Maintenance Clerk	1	1	1	1	1	1	1	1	1	1	1
Maint Shift Foreman	2	4	4	4	4	4	4	4	4	4	4
Chief Mine Engineer	1	1	1	1	1	1	1	1	1	1	1
Senior Mine Engineer	1	1	1	1	1	1	1	1	1	1	1
Junior Mine Engineer	1	1	1	1	1	1	1	1	1	1	1
Engineer Clerk	1	1	1	1	1	1	1	1	1	1	1
Senior Geologist	1	1	1	1	1	1	1	1	1	1	1
Mine Geologist	1	1	1	1	1	1	1	1	1	1	1
Surveyor	1	1	1	1	1	1	1	1	1	1	1
Surveyor Helper	1	1	1	1	1	1	1	1	1	1	1
Ore Control	1	1	1	1	1	1	1	1	1	1	1
Draftsman	1	1	1	1	1	1	1	1	1	1	1
Computer System Opr	1	1	1	1	1	1	1	1	1	1	1
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Total Staff	21	25	25	25	25	25	25	25	25	25	25

8.0 MINE CAP. COSTS

8.0 MINE CAPITAL COSTS

The capital cost of mine equipment was calculated based on the equipment requirements established in Section 6. The purchase cost of the equipment was based on recent vendor quotes rather than on list prices. The purchase schedule is based on the mine production and construction schedules discussed in Section 4. All capital costs are given in constant US dollars referenced to the fourth quarter of 1990.

Table 8-1 illustrates the number of units that will have to be purchased through the mine life. Placement of equipment orders will be required in advance of purchase, but payment is usually made at the time of delivery. Consequently, there is no prescheduling of purchase in advance of need in Table 8-1, and all units are shown as being purchased in the year in which they are required for mine operation.

Both initial purchases and replacement purchases are shown on Table 8-1. The costs shown in Table 8.1 include tire costs, a 4% state sales tax, and transportation and construction charges where necessary. The replacement life of the various equipment items has been established based on historic life of similar equipment at other mines in the western U.S. The useful operating life of each unit is based on the total hours that the unit operates rather than the number of years that the item is owned. All equipment is replaced at the new purchase price except for the 13.5 cu yd loader, which is rebuilt in year 7 at a cost equal to half of the new purchase price without tires.

The capital costs of the mine shop, warehouse and change house have been estimated separately by Roberts & Schaefer based on floor space estimates prepared by IMC.

Table 8-1

Brohm, Gilt Edge Project
Mine Capital Cost Estimate

		Preprod		Year 1		Year 2		Year 5		Year 7	
	Unit Cost $ x 1000	No. Units	Cost $x1000	No. Units	Cost $x1000	No. Units	Cost $x1000	No. Units	Cost $x1000	No. Units	Cost $x1000
Major Mine Equipment											
Blast Hole Drill (7.25 in)	410	2	820	1	410						
Air Track Drill (3 in)	204	1	204								
Hydraulic Shovel (13.5 yd)	1445	2	2890	1	1445						
Front End Loader (13.5 yd)	794	1	794							0.5	380
Haul Truck (85 ton)	592	7	4144	4	2368	6	3552				
Track Dozer (370 hp)	406	2	812					2	812		
Track Dozer (285 hp)	302	1	302					1	302		
Track Dozer (165 hp)	173	1	173					1	173		
Wheel Dozer (310 hp)	288	3	864					3	864		
Motor Grader (16 ft)	327	1	327	1	327			1	327		
Water Truck (8000 gal)	312	1	312	1	312						
Rock Breaker	137	1	137								
Minor Mine Operations Equipment											
Backhoe (1-2 yd)	209	1	209								
ANFO/Slurry Truck	187	1	187								
Tool Carrier	111	1	111								
Powder Crew Truck	31	1	31								
Stemming-Sander Truck	83	1	83								
Man Van (4x4)	31	1	31								
Pickups (4x4)	19	8	152					8	152		
Ambulance	35	1	35								
Fire Trailer	26	1	26								
Light Plants	14	6	84					6	84		
Mine Pumps	41	1	41	1	41			1	41		
Mine Radios	49	1	49								
Safety Equipment	11	1	11								
Engineering Equipment	57	1	57								
Minor Maintenance Equipment											
Rough Terrain Crane	208	1	208								
Lube Truck	166	2	332					2	332		
Fuel Truck (5000 gal)	83	1	83					1	83		
Boom Truck (20 ton)	135	1	135								
Tire Truck	90	1	90								
Forklift-Tire Handler	54	1	54								
Forklift Shop/Warehouse	49	1	49								
Mechanics Truck	83	2	166								
Welding Truck	52	1	52								
Supply Flatbed	41	1	41								
Pickups (4x4)	19	2	38					2	38		
Maintenance Computer	40	1	40								
Shop Crane	140	1	140								
Shop Tools (3% of Major Equip)			353								
Spare Parts (2% of Major Equip)			236								
Mine Structures											
Blasting Agent Storage	15		15								
Explosives Magazine	12		12								
Total Capital $ x 1000			14930		4903		3552		3208		380

9.0 MINE OPER. COSTS

9.0 MINE OPERATING COSTS

Mine operating costs were calculated based on manpower and equipment operating requirements. The mine production schedule was used as the primary input for the calculations. Operating costs were calculated in dollars per ton referenced to the total scheduled tons of material to be moved, and are given in constant US dollars referenced to the fourth quarter of 1990.

The mine operating costs presented in this section include the costs of:

1) Stockpiling and rehandling ROM mill & leach ore.

2) Hauling waste to waste dumps and to tailings and roadfill embankments.

3) Placing waste material in waste dumps.

4) Constructing access and haul roads in the pit and waste dump area.

They do not include the costs of:

1) Constructing and maintaining roads outside the pit and waste dump area (including plant site roads, mine access roads and the tailings dam road).

2) Compacting the waste fill placed in the tailings embankments.

3) Preparing waste dumps (clearing & grubbing, topsoil stockpiling, dump liners, french drains, surface water diversion channels, settling ponds, water treatment facilities, pumpback systems etc.)

4) Reclaiming waste dumps (final grading, replacement of topsoil etc.)

5) Clearing and grubbing in advance of mining (about 50 acres will have to be cleared & grubbed to expand from the oxide pit to the ultimate pit limit).

Mine operating costs are summarized by year and by category in Table 9-1. The basic information used to calculate these costs is summarized in Table 9-2. The detailed calculations on which the operating cost estimates are based are presented in Tables 9-3 to 9-36.

Tables 9-3 to 9-14 summarize the costs to operate the major mine equipment. The costs shown in these tables are multiplied by the number of required operating shifts for each piece of equipment to calculate the cost of parts and consumables utilized (the required number of shifts for each major piece of mining equipment is given in Section 6).

Operating manpower is not included in this calculation, and the maintenance labor cost per hour is used only as a guide to estimate the required number of maintenance personnel.

The costs to operate the mine equipment are based on information provided by the manufacturers, and on operating information from other US mines adjusted to reflect the local operating conditions at Gilt Edge. All equipment costs are based on an 8 hour shift and 7 metered hours of operation (420 minutes) per shift. Actual productive time is based on 350 minutes (or seven 50-minute hours) per shift.

The cost of blasting consumables is developed on Tables 9-15 to 9-22. The powder factors are based on recent experience by the current contractor at the Gilt Edge mine and on the judgement of IMC engineers. The unit costs of blasting agents are based on budget quotes provided by explosives manufactures.

The cost of blasting agents and equipment consumables are combined and presented on a cost per ton basis in Table 9-23. This table excludes manpower costs and summarizes the portion of the total cost per ton that is a function of non-personnel items. The Table 9-23 cost is obtained by multiplying the number of required working shifts for the equipment item by the parts and consumable cost per shift, divided by the total tons scheduled to be mined.

Based on prior experience, IMC has estimated the general mine and general maintenance consumable costs shown on Table 9-23 at $0.01 per ton of total material mined. This cost includes such items as fuel and parts for the small support equipment (flatbed trucks, ANFO trucks, fuel and lube trucks etc).

Salaried labor costs and requirements are shown on Tables 9-24 and 9-25. Salary and fringe benefit rates are based on data supplied by Brohm, while IMC has estimated the number of supervisory and engineering personnel that will be required to manage the mine and maintenance operations. Salaried labor costs and fringes report to the General and Administrative category on Table 9-1.

The hourly labor requirements, wage sales and costs through the mine life are shown on Tables 9-26 to 9-36. The labor costs from these tables and from the supervisory labor tables were combined with the costs of consumables to establish the total costs shown on Table 9-1.

Hourly paid personnel costs are assigned to drilling, blasting, loading or other unit operations cost categories based on the specific job assignment, while maintenance personnel costs are prorated between different unit operations cost categories based on the number of operating shifts for, and the maintenance requirements of, each equipment type. The following list illustrates the manner in which personnel costs are assigned to different unit operations categories:

Job Description	Unit Operations Category for Cost Estimate
Driller	Drilling
Air Track Operator	Auxiliary
Shovel Operator	Loading
Loader Operator	Loading
Truck Driver	Hauling
Track Dozer Operators	Auxiliary
Tire Dozer Operators	Auxiliary
Water Truck Driver	Auxiliary
Grader Operator	Auxiliary
Rock Breaker Operator	Auxiliary
Blasting Crew	Blasting
General Laborer	General Mine
Mechanics	Split to All Categories
Mechanics Helper	Split to All Categories
Welder	Split to All Categories
Electrician	Split to All Categories
Fuel and Lube Man	General Maintenance
Tire Man	General Maintenance

Fringe benefits for hourly personnel are 39%, which includes the cost of additional personnel to cover vacation, sickness, and absenteeism. A 5% overtime allowance is also assumed. The cost of hourly personnel fringe benefits is reported under the G&A category in Table 9-1.

Table 9-37 breaks out the incremental costs of hauling waste to the tailings embankments instead of to the mine waste dump. This cost breakdown was requested by Roberts & Schaefer.

Table 9-1

Brohm Gilt Edge Project

Operating Cost Summary
Cost per Ton of Total Material

Period	Total Mine Production (kton)	Dollars per Total Ton								
		Drill	Blast	Load	Haul	Auxil	GMine	GMaint	G&A	Total
Prep	9957	0.0955	0.0915	0.1084	0.2067	0.1877	0.0189	0.0201	0.2714	1.0002
Year 1	18153	0.0918	0.0796	0.1010	0.2073	0.1150	0.0128	0.0152	0.1333	0.7560
Year 2	22702	0.0807	0.0999	0.0932	0.2613	0.1111	0.0122	0.0142	0.1224	0.7950
Year 3	22699	0.0847	0.0911	0.0900	0.2545	0.0987	0.0122	0.0142	0.1204	0.7658
Year 4	22700	0.0845	0.0902	0.0900	0.2561	0.1023	0.0122	0.0142	0.1208	0.7703
Year 5	22703	0.0889	0.0849	0.0905	0.2333	0.0981	0.0122	0.0142	0.1188	0.7409
Year 6	22709	0.0821	0.0952	0.0896	0.2657	0.0984	0.0122	0.0142	0.1211	0.7785
Year 7	15798	0.0789	0.1036	0.0960	0.2855	0.1214	0.0132	0.0160	0.1535	0.8681
Year 8	10555	0.0791	0.1056	0.1032	0.3321	0.1758	0.0148	0.0190	0.2116	1.0412
Year 9	10171	0.0791	0.1059	0.1033	0.3853	0.1844	0.0150	0.0194	0.2232	1.1156
Year 10	4273	0.0783	0.1051	0.1054	0.4188	0.2161	0.0159	0.0212	0.2568	1.2176
Average		0.0844	0.0938	0.0949	0.2653	0.1210	0.0131	0.0155	0.1472	0.8352

Table 9-2

Brohm Gilt Edge Project

General Input Data to Operating Costs

Mine Schedule	
	350 days/year
	3 shifts/day
	8 hours/shift
Equipment Working Time	
Metered Equipment Hours	7 hours/shift
Productive Minutes/Shift	350 minutes/shift
Mine Schedule	
	365 days/year
	3 shifts/day
Mine Manpower Work Schedule	
Work days/man/year	240 days/year
	8 hours/day
Constants	
Diesel Fuel Cost	$0.80 /gallon
Sales Tax on Consumables	4 %
All Costs in 4th Quarter 1990 Dollars	

Table 9-3

Brohm Gilt Edge Project

Operating Cost per Shift

Blast Hole Drill (7.25 in)	
Delivered Cost $x1000	410.00
Fuel Consumption gal/hr	17.00
Bit Cost $	600.00
Bit Life Hours	14.70
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	13.60
Repair Parts	16.65
Maintenance labor	9.40
Bit Cost	40.82
Stabilizer Cost .78 of Bit Cost	31.84
Undercarriage Cost	4.40
Lube, Oil, Filters, Grease	.95

	117.66
Cost per 420 Operating and 350 Drilling Minute Shift	
Maintenance Labor	65.80
Parts and Consumables *	673.05

Total	738.85

* Bit and Stabilizer costs based on drilling hours

Table 9-4

Brohm Gilt Edge Project

Operating Cost per Shift

Air Track Drill (3 in)	
Delivered Cost $x1000	204.00
Fuel Consumption gal/hr	6.00
Bit Cost $	120.00
Bit Life Hours	14.30
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	4.80
Repair Parts	2.88
Maintenance labor	2.40
Bit Cost	8.39
Stabilizer Cost 1.75 of Bit Cost	14.68
Undercarriage Cost	.72
Lube, Oil, Filters, Grease	1.50
	35.37

Cost per 420 Operating and 350 Drilling Minute Shift

Maintenance Labor	16.80
Parts and Consumables *	203.88
Total	220.68

* Bit and Stabilizer costs based on drilling hours

Table 9-5

Brohm Gilt Edge Project

Operating Cost per Shift

Hydraulic Shovel (13.5 yd)	
Delivered Cost $x1000	1445.00
Fuel Consumption gal/hr	33.00
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	26.40
Repair Parts	27.13
Maintenance Labor	19.99
Wear Items	14.43
Undercarriage Cost	5.51
Lube, Oil, Filters, Grease	5.07

	98.53
Cost per 420. Minute Shift	
Maintenance Labor	139.93
Parts and Consumables	549.78

Total	689.71

Table 9-6

Brohm Gilt Edge Project

Operating Cost per Shift

Front End Loader (13.5 yd)	
Delivered Cost $x1000	794.00
Delivered Cost less Tires $x1000	761.00
Fuel Consumption gal/hr	25.00
Cost per Tire $	8292.00
Number of Tires	4.
Tire Life in Hours	5000.
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	20.00
Repair Parts	25.44
Maintenance Labor	16.09
Wear Items	8.86
Tire Cost	6.63
Cost for Lube, Oil, Filters, Grease	3.56

	80.58
Cost per 420. Minute Shift	
Maintenance Labor	112.63
Parts and Consumables	451.43

Total	564.06

Table 9-7

Brohm Gilt Edge Project

Operating Cost per Shift

Haul Truck (85 t)	
Delivered Cost $x1000	592.00
Delivered Cost less Tires $x1000	556.00
Fuel Consumption gal/hr	27.00
Cost per Tire $	5995.00
Number of Tires	6.
Tire Life in Hours	4500.
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	21.60
Repair Parts	11.53
Maintenance Labor	7.61
Tire Cost	7.99
Lube, Oil, Filters, Grease	.96
	49.69
Cost per 420. Minute Shift	
Maintenance Labor	53.27
Parts and Consumables	294.56
Total	347.83

Table 9-8

Brohm Gilt Edge Project

Operating Cost per Shift

Track Dozer (370 nhp)	
Delivered Cost $x1000	406.00
Fuel Consumption gal/hr	13.00
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	10.40
Repair Parts	10.94
Maintenance Labor	5.05
Wear Items	3.94
Undercarriage Cost	9.50
Lube, Oil, Filters, Grease	.82

	40.65
Cost per 420. Minute Shift	
Maintenance Labor	35.35
Parts and Consumables	249.20

Total	284.55

Table 9-9

Brohm Gilt Edge Project

Operating Cost per Shift

Track Dozer (285 nhp)	
Delivered Cost $x1000	302.00
Fuel Consumption gal/hr	10.00
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	8.00
Repair Parts	8.75
Maintenance Labor	3.83
Wear Items	3.44
Undercarriage Cost	8.50
Lube, Oil, Filters, Grease	.75
	33.27
Cost per 420. Minute Shift	
Maintenance Labor	26.81
Parts and Consumables	206.08
Total	232.89

Table 9-10

Brohm Gilt Edge Project

Operating Cost per Shift

Track Dozer (165 nhp)	
Delivered Cost $x1000	173.00
Fuel Consumption gal/hr	6.00
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	4.80
Repair Parts	5.07
Maintenance Labor	3.56
Wear Items	2.36
Undercarriage Cost	6.20
Lube, Oil, Filters, Grease	.43

	22.42
Cost per 420. Minute Shift	
Maintenance Labor	24.92
Parts and Consumables	132.02

Total	156.94

Table 9-11

Brohm Gilt Edge Project

Operating Cost per Shift

Tire Dozer (310 nhp)	
Delivered Cost $x1000	288.00
Delivered Cost less Tires $x1000	276.00
Fuel Consumption gal/hr	9.00
Cost per Tire $	3101.00
Number of Tires	4.
Tire Life in Hours	4500.
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	7.20
Repair Parts	6.85
Maintenance Labor	4.75
Wear Items	1.72
Tire Cost	2.76
Cost for Lube, Oil, Filters, Grease	.43

	23.71
Cost per 420. Minute Shift	
Maintenance Labor	33.25
Parts and Consumables	132.72

Total	165.97

Table 9-12

Brohm Gilt Edge Project

Operating Cost per Shift

Water Truck (8,000 gal)	
Delivered Cost $x1000	312.00
Delivered Cost less Tires $x1000	299.00
Fuel Consumption gal/hr	13.00
Cost per Tire $	2236.00
Number of Tires	6.
Tire Life in Hours	3800.
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	10.40
Repair Parts	6.75
Maintenance Labor	5.76
Tire Cost	3.53
Lube, Oil, Filters, Grease	.71
	27.15
Cost per 420. Minute Shift	
Maintenance Labor	40.32
Parts and Consumables	149.73
Total	190.05

Table 9-13

Brohm Gilt Edge Project

Operating Cost per Shift

Motor Grader (16 ft)	
Delivered Cost $x1000	327.00
Delivered Cost less Tires $x1000	319.00
Fuel Consumption gal/hr	9.00
Cost per Tire $	1347.00
Number of Tires	6.
Tire Life in Hours	4500.
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	7.20
Repair Parts	6.92
Maintenance Labor	6.02
Wear Items	1.15
Tire Cost	1.80
Cost for Lube, Oil, Filters, Grease	.79

	23.88
Cost per 420. Minute Shift	
Maintenance Labor	42.14
Parts and Consumables	125.02

Total	167.16

Table 9-14

Brohm Gilt Edge Project

Operating Cost per Shift

Rock Breaker	
Delivered Cost $x1000	137.00
Delivered Cost less Tires $x1000	132.00
Fuel Consumption gal/hr	3.00
Cost per Tire $	1350.00
Number of Tires	4.
Tire Life in Hours	4500.
Cost Breakdown	**Cost per Hour**
Fuel Cost $ .80/gal	2.40
Repair Parts	3.68
Maintenance Labor	2.42
Wear Items	9.62
Tire Cost	1.20
Cost for Lube, Oil, Filters, Grease	.39
	19.71
Cost per 420. Minute Shift	
Maintenance Labor	16.94
Parts and Consumables	121.03
Total	137.97

Table 9-15

Brohm Gilt Edge Project

Blasting Supplies Cost - Dry Mill Ore

In-Place Density (cu ft/st)		11.90
Bench Height (ft)		20
Sub-Grade (ft)		3
Hole Diameter (in)		7.25
Column Height (ft)		10.33
Powder Specific Gravity		0.82
Powder Factor (lb/st)		0.46
Powder per Hole (lb/hole)		151.53
Tons per Hole (st/hole)		329.42
Spacing (ft)		14.00
Cost per Round of 100 Holes:		
Delay/Det	$2.20/unit	248.60
Primacord	$0.11/ft	132.44
Booster	$2.40/unit	240.00
ANFO	$0.11/lb	1666.84
Cost per Round		$2287.88
Cost per Ton		$0.0695

Table 9-16

Brohm Gilt Edge Project

Blasting Supplies Cost - Dry Leach Ore

In-Place Density (cu ft/st)		12.36
Bench Height (ft)		20
Sub-Grade (ft)		3
Hole Diameter (in)		7.25
Column Height (ft)		9.94
Powder Specific Gravity		0.82
Powder Factor (lb/st)		0.46
Powder per Hole (lb/hole)		145.81
Tons per Hole (st/hole)		316.98
Spacing (ft)		14.00
Cost per Round of 100 Holes:		
Delay/Det	$2.20/unit	248.60
Primacord	$0.11/ft	132.40
Booster	$2.40/unit	240.00
ANFO	$0.11/lb	1603.91
Cost per Round		$2224.92
Cost per Ton		$0.0702

Table 9-17

Brohm Gilt Edge Project

Blasting Supplies Cost - Dry Waste

In-Place Density (cu ft/st)		12.00
Bench Height (ft)		20
Sub-Grade (ft)		3
Hole Diameter (in)		7.25
Column Height (ft)		10.24
Powder Specific Gravity		0.82
Powder Factor (lb/st)		0.46
Powder per Hole (lb/hole)		150.21
Tons per Hole (st/hole)		326.55
Spacing (ft)		14.00
Cost per Round of 100 Holes:		
Delay/Det	$2.20/unit	248.60
Primacord	$0.11/ft	132.42
Booster	$2.40/unit	240.00
ANFO	$0.11/lb	1652.32
Cost per Round		$2273.34
Cost per Ton		$0.0696

Table 9-18

Brohm Gilt Edge Project

Blasting Supplies Cost - Wet Mill Ore

In-Place Density (cu ft/st)		11.90
Bench Height (ft)		20
Sub-Grade (ft)		3
Hole Diameter (in)		7.25
Column Height (ft)		8.85
Powder Specific Gravity		1.25
Powder Factor (lb/st)		0.46
Powder per Hole (lb/hole)		197.90
Tons per Hole (st/hole)		430.21
Spacing (ft)		16.00
Cost per Round of 100 Holes:		
Delay/Det	$2.20/unit	248.60
Primacord	$0.11/ft	151.35
Booster	$2.40/unit	240.00
Slurry	$0.20/lb	3957.96
Cost per Round		$4597.91
Cost per Ton		$0.1069

Table 9-19

Brohm Gilt Edge Project

Blasting Supplies Cost - Wet Leach Ore

In-Place Density (cu ft/st)		12.36
Bench Height (ft)		20
Sub-Grade (ft)		3
Hole Diameter (in)		7.25
Column Height (ft)		8.52
Powder Specific Gravity		1.25
Powder Factor (lb/st)		0.46
Powder per Hole (lb/hole)		190.52
Tons per Hole (st/hole)		414.17
Spacing (ft)		16.00
Cost per Round of 100 Holes:		
Delay/Det	$2.20/unit	248.60
Primacord	$0.11/ft	151.35
Booster	$2.40/unit	240.00
Slurry	$0.20/lb	3810.37

Cost per Round		$4450.32
Cost per Ton		$0.1075

Table 9-20

Brohm Gilt Edge Project

Blasting Supplies Cost - Wet Waste

In-Place Density (cu ft/st)		12.00
Bench Height (ft)		20
Sub-Grade (ft)		3
Hole Diameter (in)		7.25
Column Height (ft)		8.78
Powder Specific Gravity		1.25
Powder Factor (lb/st)		0.46
Powder per Hole (lb/hole)		196.33
Tons per Hole (st/hole)		426.81
Spacing (ft)		16.00
Cost per Round of 100 Holes:		
Delay/Det	$2.20/unit	248.60
Primacord	$0.11/ft	151.39
Booster	$2.40/unit	240.00
Slurry	$0.20/lb	3926.65

Cost per Round		$4566.63
Cost per Ton		$0.1070

Table 9-21

Brohm Gilt Edge Project

Blasting Supplies Cost - Mine Blast Hole Drills

Condition: B5200 and Above — 20 % Wet Holes
B5180 and Below — 80 % Wet Holes

		Dry	Wet
Mill	Blasting Suplies ($/ton):	0.0695	0.1069
Leach	Blasting Suplies ($/ton):	0.0702	0.1075
Waste	Blasting Suplies ($/ton):	0.0696	0.1070

	Bench 5200 and Above			Bench 5200 and Below			***** Mill Ore *****		
	Mill (kt)	Leach (kt)	Waste (kt)	Mill (kt)	Leach (kt)	Waste (kt)	Above (dec)	Dry Frac (dec)	Rate ($/ton)
PRE	75	532	9350	0	0	0	1.00	0.80	0.0770
YR1	3837	816	13500	0	0	0	1.00	0.80	0.0770
YR2	1722	141	2908	2840	646	14445	0.38	0.43	0.0909
YR3	665	0	10703	3897	0	7434	0.15	0.29	0.0961
YR4	286	0	10670	4276	0	7022	0.06	0.24	0.0980
YR5	852	0	15794	3710	0	2065	0.19	0.31	0.0952
YR6	668	0	6062	3894	0	11963	0.15	0.29	0.0961
YR7	0	0	0	4562	0	11236	0.00	0.20	0.0994
YR8	0	0	0	4562	0	5993	0.00	0.20	0.0994
YR9	0	0	0	4562	0	5609	0.00	0.20	0.0994
Y10	0	0	0	1878	0	2395	0.00	0.20	0.0994

***** Leach Ore *****			***** Waste *****			AVERAGE	COST
Above (dec)	Dry Frac (dec)	Rate ($/ton)	Above (dec)	Dry Frac (dec)	Rate ($/ton)	($/TON)	$(1000)
1.00	0.80	0.0777	1.00	0.80	0.0771	0.0771	768
1.00	0.80	0.0777	1.00	0.80	0.0771	0.0771	1399
0.18	0.31	0.0960	0.17	0.30	0.0958	0.0948	2152
0.00	0.20	0.1000	0.59	0.55	0.0863	0.0883	2003
0.00	0.20	0.1000	0.60	0.56	0.0860	0.0885	1968
0.00	0.20	0.1000	0.88	0.73	0.0797	0.0828	1857
0.00	0.20	0.1000	0.34	0.40	0.0920	0.0928	2096
0.00	0.20	0.1000	0.00	0.20	0.0995	0.0995	1572
0.00	0.20	0.1000	0.00	0.20	0.0995	0.0995	1050
0.00	0.20	0.1000	0.00	0.20	0.0995	0.0995	1012
0.00	0.20	0.1000	0.00	0.20	0.0995	0.0995	425

Table 9-22

Brohm Gilt Edge Project

Average Blasting Supplies Cost Per Ton

Period	Blast Hole Drill ($1000)	Air Track* Drill ($1000)	Oper. Cost Total Tons (ktons)	Cost/Ton ($/ton)
PREP	768	76	9957	0.0848
YR1	1399	64	18878	0.0775
YR2	2152	78	22702	0.0982
YR3	2003	27	22699	0.0894
YR4	1968	41	22700	0.0885
YR5	1857	31	22703	0.0832
YR6	2096	27	22709	0.0935
YR7	1572	27	15798	0.1012
YR8	1050	27	10555	0.1020
YR9	1012	27	10171	0.1022
YR10	425	13	4348	0.1007
TOTAL	16302	438	183220	0.0914

* Air Track supply cost based on the Dry Waste Cost of $0.0696/ton

Table 9-23

Brohm Gilt Edge Project

Parts and Consumables
Cost per Ton of Total Material

Period	Total Mine Production (kton)	Dollars per Total Ton							
		Drill	Blast	Load	Haul	Auxil	GMine	GMaint	Total
Prep	9957	0.0746	0.0848	0.0710	0.1361	0.0980	0.0100	0.0100	0.4846
Year 1	18153	0.0746	0.0775	0.0714	0.1424	0.0648	0.0100	0.0100	0.4508
Year 2	22702	0.0657	0.0982	0.0669	0.1810	0.0626	0.0100	0.0100	0.4944
Year 3	22699	0.0691	0.0894	0.0638	0.1752	0.0551	0.0100	0.0100	0.4725
Year 4	22700	0.0690	0.0885	0.0638	0.1767	0.0577	0.0100	0.0100	0.4756
Year 5	22703	0.0720	0.0832	0.0638	0.1603	0.0541	0.0100	0.0100	0.4533
Year 6	22709	0.0669	0.0935	0.0638	0.1834	0.0551	0.0100	0.0100	0.4826
Year 7	15798	0.0639	0.1012	0.0666	0.1964	0.0681	0.0100	0.0100	0.5162
Year 8	10555	0.0638	0.1020	0.0713	0.2252	0.0968	0.0100	0.0100	0.5790
Year 9	10171	0.0638	0.1022	0.0718	0.2628	0.1027	0.0100	0.0100	0.6233
Year 10	4273	0.0638	0.1007	0.0735	0.2855	0.1196	0.0100	0.0100	0.6630

Table 9-24

Brohm Gilt Edge Project

Salaried Mine Labor
Prep

Job	Number	Rate	Cost $x1000
Mine Superintendent	1	60000.	105.0
Mine General Foreman	1	50000.	87.5
Mine Clerk	1	14000.	24.5
Mine Shift Foreman	2	36000.	126.0
Drill & Blast Forema	1	40000.	70.0
Maintenance Foreman	1	45000.	78.8
Maintenance Clerk	1	14000.	24.5
Maint Shift Foreman	2	36000.	126.0
Chief Mine Engineer	1	50000.	87.5
Senior Mine Engineer	1	45000.	78.8
Junior Mine Engineer	1	35000.	61.3
Engineer Clerk	1	14000.	24.5
Senior Geologist	1	55000.	96.3
Mine Geologist	1	40000.	70.0
Surveyor	1	25000.	43.8
Survey Helper	1	20000.	35.0
Ore Control	1	20000.	35.0
Draftsman	1	20000.	35.0
Computer System Opr	1	30000.	52.5

Subtotal			1262.0
Fringes 39.0 Percent			492.2

Total			1754.2

Table 9-25

Brohm Gilt Edge Project

Salaried Mine Labor
Years 1 - 10

Job	Number	Rate	Cost $x1000
Mine Superintendent	1	60000.	60.0
Mine General Foreman	1	50000.	50.0
Mine Clerk	1	14000.	14.0
Mine Shift Foreman	4	36000.	144.0
Drill & Blast Forema	1	40000.	40.0
Maintenance Foreman	1	45000.	45.0
Maintenance Clerk	1	14000.	14.0
Maint Shift Foreman	4	36000.	144.0
Chief Mine Engineer	1	50000.	50.0
Senior Mine Engineer	1	45000.	45.0
Junior Mine Engineer	1	35000.	35.0
Engineer Clerk	1	14000.	14.0
Senior Geologist	1	55000.	55.0
Mine Geologist	1	40000.	40.0
Surveyor	1	25000.	25.0
Survey Helper	1	20000.	20.0
Ore Control	1	20000.	20.0
Draftsman	1	20000.	20.0
Computer System Opr	1	30000.	30.0

Subtotal			865.0
Fringes 39.0 Percent			337.4

Total			1202.3

Table 9-26

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Prep

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	3	12.50	42000	126.0
Air Track Opr	1	12.50	42000	42.0
Shovel Opr	3	13.00	43680	131.0
Loader Opr	1	13.00	43680	43.7
Truck Driver	11	11.50	38640	425.0
Dozer (370 NHP) Opr	3	12.50	42000	126.0
Dozer (285 NHP) Opr	2	12.50	42000	84.0
Dozer (165 NHP) Opr	1	11.50	38640	38.6
Tire Dozer Opr	4	12.50	42000	168.0
Water Truck Opr	2	11.50	38640	77.3
Grader Opr	2	12.50	42000	84.0
Rock Breaker Opr	1	12.50	42000	42.0
Blasting Crew	2	9.45	31752	63.5
General Laborer	3	8.40	28224	84.7
	---			-------
Subtotal	39			1535.8
Mine Maintenance				
Mechanic	7	13.50	45360	317.5
Mechanics Helper	3	9.45	31752	95.3
Welder	4	13.00	43680	174.7
Electrician	2	14.50	48720	97.4
Fuel & Lube Man	2	9.45	31752	63.5
Tire Man	1	9.45	31752	31.8
	---			-------
Subtotal	19			780.2
Overtime 5.0 percent	3			115.8
Fringes 39.0 percent				948.4

Total				3380.2

Table 9-27

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 1

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	8	12.50	24000	192.0
Air Track Opr	2	12.50	24000	48.0
Shovel Opr	8	13.00	24960	199.7
Loader Opr	2	13.00	24960	49.9
Truck Driver	34	11.50	22080	750.7
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	8	12.50	24000	192.0
Water Truck Opr	4	11.50	22080	88.3
Grader Opr	4	12.50	24000	96.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	86			1961.5
Mine Maintenance				
Mechanic	16	13.50	25920	414.7
Mechanics Helper	8	9.45	18144	145.2
Welder	10	13.00	24960	249.6
Electrician	4	14.50	27840	111.4
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	43			1011.6
Overtime 5.0 percent	6			148.7
Fringes 39.0 percent				1217.5

Total				4339.3

Table 9-28

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 2

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	9	12.50	24000	216.0
Air Track Opr	2	12.50	24000	48.0
Shovel Opr	9	13.00	24960	224.6
Loader Opr	2	13.00	24960	49.9
Truck Driver	53	11.50	22080	1170.2
Dozer (370 NHP) Opr	6	12.50	24000	144.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	9	12.50	24000	216.0
Water Truck Opr	6	11.50	22080	132.5
Grader Opr	6	12.50	24000	144.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
Subtotal	113			2570.1
Mine Maintenance				
Mechanic	22	13.50	25920	570.2
Mechanics Helper	10	9.45	18144	181.4
Welder	12	13.00	24960	299.5
Electrician	5	14.50	27840	139.2
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
Subtotal	54			1281.0
Overtime 5.0 percent	8			192.6
Fringes 39.0 percent				1577.0
Total				5620.7

Table 9-29

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 3

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	9	12.50	24000	216.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	9	13.00	24960	224.6
Loader Opr	2	13.00	24960	49.9
Truck Driver	52	11.50	22080	1148.2
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	9	12.50	24000	216.0
Water Truck Opr	5	11.50	22080	110.4
Grader Opr	5	12.50	24000	120.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	108			2454.0
Mine Maintenance				
Mechanic	22	13.50	25920	570.2
Mechanics Helper	10	9.45	18144	181.4
Welder	12	13.00	24960	299.5
Electrician	5	14.50	27840	139.2
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	54			1281.0
Overtime 5.0 percent	8			186.7
Fringes 39.0 percent				1529.5

Total				5451.2

Table 9-30

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 4

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	9	12.50	24000	216.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	9	13.00	24960	224.6
Loader Opr	2	13.00	24960	49.9
Truck Driver	52	11.50	22080	1148.2
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	9	12.50	24000	216.0
Water Truck Opr	5	11.50	22080	110.4
Grader Opr	6	12.50	24000	144.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	109			2478.0
Mine Maintenance				
Mechanic	22	13.50	25920	570.2
Mechanics Helper	10	9.45	18144	181.4
Welder	12	13.00	24960	299.5
Electrician	5	14.50	27840	139.2
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	54			1281.0
Overtime 5.0 percent	8			188.0
Fringes 39.0 percent				1539.3

Total				5486.3

Table 9-31

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 5

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	10	12.50	24000	240.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	9	13.00	24960	224.6
Loader Opr	2	13.00	24960	49.9
Truck Driver	47	11.50	22080	1037.8
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	9	12.50	24000	216.0
Water Truck Opr	5	11.50	22080	110.4
Grader Opr	5	12.50	24000	120.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	104			2367.6
Mine Maintenance				
Mechanic	22	13.50	25920	570.2
Mechanics Helper	10	9.45	18144	181.4
Welder	12	13.00	24960	299.5
Electrician	5	14.50	27840	139.2
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	54			1281.0
Overtime 5.0 percent	8			182.4
Fringes 39.0 percent				1494.1

Total				5325.1

Table 9-32

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 6

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	9	12.50	24000	216.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	9	13.00	24960	224.6
Loader Opr	2	13.00	24960	49.9
Truck Driver	54	11.50	22080	1192.3
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	9	12.50	24000	216.0
Water Truck Opr	5	11.50	22080	110.4
Grader Opr	5	12.50	24000	120.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	110			2498.1
Mine Maintenance				
Mechanic	22	13.50	25920	570.2
Mechanics Helper	10	9.45	18144	181.4
Welder	12	13.00	24960	299.5
Electrician	5	14.50	27840	139.2
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	54			1281.0
Overtime 5.0 percent	8			189.0
Fringes 39.0 percent				1547.6

Total				5515.7

Table 9-33

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 7

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	6	12.50	24000	144.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	7	13.00	24960	174.7
Loader Opr	2	13.00	24960	49.9
Truck Driver	40	11.50	22080	883.2
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	8	12.50	24000	192.0
Water Truck Opr	4	11.50	22080	88.3
Grader Opr	3	12.50	24000	72.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
Subtotal	87			1973.0
Mine Maintenance				
Mechanic	17	13.50	25920	440.6
Mechanics Helper	8	9.45	18144	145.2
Welder	9	13.00	24960	224.6
Electrician	4	14.50	27840	111.4
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
Subtotal	43			1012.5
Overtime 5.0 percent	7			149.3
Fringes 39.0 percent				1222.6
Total				4357.4

Table 9-34

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 8

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	4	12.50	24000	96.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	4	13.00	24960	99.8
Loader Opr	2	13.00	24960	49.9
Truck Driver	31	11.50	22080	684.5
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	8	12.50	24000	192.0
Water Truck Opr	3	11.50	22080	66.2
Grader Opr	3	12.50	24000	72.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	72			1629.3
Mine Maintenance				
Mechanic	15	13.50	25920	388.8
Mechanics Helper	7	9.45	18144	127.0
Welder	8	13.00	24960	199.7
Electrician	3	14.50	27840	83.5
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	38			889.7
Overtime 5.0 percent	6			126.0
Fringes 39.0 percent				1031.5

Total				3676.5

Table 9-35

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 9

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	4	12.50	24000	96.0
Air Track Opr	1	12.50	24000	24.0
Shovel Opr	4	13.00	24960	99.8
Loader Opr	2	13.00	24960	49.9
Truck Driver	35	11.50	22080	772.8
Dozer (370 NHP) Opr	5	12.50	24000	120.0
Dozer (285 NHP) Opr	3	12.50	24000	72.0
Dozer (165 NHP) Opr	2	11.50	22080	44.2
Tire Dozer Opr	8	12.50	24000	192.0
Water Truck Opr	3	11.50	22080	66.2
Grader Opr	3	12.50	24000	72.0
Rock Breaker Opr	1	12.50	24000	24.0
Blasting Crew	2	9.45	18144	36.3
General Laborer	3	8.40	16128	48.4
	---			-------
Subtotal	76			1717.6
Mine Maintenance				
Mechanic	15	13.50	25920	388.8
Mechanics Helper	7	9.45	18144	127.0
Welder	8	13.00	24960	199.7
Electrician	3	14.50	27840	83.5
Fuel & Lube Man	3	9.45	18144	54.4
Tire Man	2	9.45	18144	36.3
	---			-------
Subtotal	38			889.7
Overtime 5.0 percent	6			130.4
Fringes 39.0 percent				1067.7

Total				3805.4

Table 9-36

Brohm Gilt Edge Project

Mine Operating and Maintenance Personnel
Hourly Labor Cost

Year 10

Job	Number	Pay Rate $/hr	Period Cost per Man $	Cost per Period $x1000
Mine Operations				
Driller	3	12.50	12000	36.0
Air Track Opr	1	12.50	12000	12.0
Shovel Opr	4	13.00	12480	49.9
Loader Opr	1	13.00	12480	12.5
Truck Driver	32	11.50	11040	353.3
Dozer (370 NHP) Opr	5	12.50	12000	60.0
Dozer (285 NHP) Opr	3	12.50	12000	36.0
Dozer (165 NHP) Opr	2	11.50	11040	22.1
Tire Dozer Opr	8	12.50	12000	96.0
Water Truck Opr	3	11.50	11040	33.1
Grader Opr	3	12.50	12000	36.0
Rock Breaker Opr	1	12.50	12000	12.0
Blasting Crew	2	9.45	9072	18.1
General Laborer	3	8.40	8064	24.2
	---			-------
Subtotal	71			801.2
Mine Maintenance				
Mechanic	14	13.50	12960	181.4
Mechanics Helper	6	9.45	9072	54.4
Welder	7	13.00	12480	87.4
Electrician	3	14.50	13920	41.8
Fuel & Lube Man	3	9.45	9072	27.2
Tire Man	2	9.45	9072	18.1
	---			-------
Subtotal	35			410.3
Overtime 5.0 percent	5			60.6
Fringes 39.0 percent				496.1

Total				1768.2

Table 9-37

Brohm Gilt Edge Project

Embankment Haulage Component of Mining Cost

Period	Total Mine Production	Embankment Waste Contained in Total		Mine Operating Cost w/o Embankment Haulage	Incremental Enbankment Haulage		Total Mine Operating Cost With Enbankment Increment	
		Cyanide	Flotation		Cyanide	Flotation		
	kton	kton	kton	$/ton	$x1000	$x1000	$/ton	$x1000
Prep	9957	984	1692	$0.9677	$52	$272	$1.0002	$9,959
Year 1	18153			$0.7560			$0.7560	$13,724
Year 2	22702	1033	1493	$0.7820	$55	$240	$0.7950	$18,048
Year 3	22699	473	754	$0.7594	$25	$121	$0.7658	$17,383
Year 4	22700	595	950	$0.7622	$32	$153	$0.7703	$17,486
Year 5	22703	735	1173	$0.7309	$39	$189	$0.7409	$16,821
Year 6	22709	117	187	$0.7769	$6	$30	$0.7785	$17,679
Year 7	15798			$0.8681			$0.8681	$13,714
Year 8	10555			$1.0412			$1.0412	$10,990
Year 9	10171			$1.1156			$1.1156	$11,347
Year 10	4273			$1.2176			$1.2176	$5,203
Average	182420	3937	6249	$0.8285	$209	$1,005	$0.8352	$152,353

APPENDIX R

APPENDIX R

RESPONSE TO COMMENTS

R.1: Comments of Mr. Jim Barron:

A copy of the written comments of Mr. Jim Barron, Vice President and Operations Manager of the Gilt Edge mine, is appended in Attachment R-1.

General: Mr. Barron's comments on the accuracy of the orebody model are discussed in the response to Mr. Miller's comments 6 and 7 in Section R.2 below.

Comments 1 through 5: Text of report modified.

Verbal question - Does IMC see any differences that would warrant a separate statistical treatment of oxide, mixed and sulfide ore?: Based on the information available, it appears that the distribution of gold remains effectively the same regardless of ore type, and as long as there is no change in the rock type or the structural environment. Gold grades are reported as being slightly higher at depth than in the shallow, more oxidized zones, and mineable grades are slightly higher in the sulfide than in the oxide material, but IMC does not consider these differences to be significant. On this basis, IMC believes that it is appropriate to treat oxide, sulfide and mixed material in the same statistical manner.

Verbal question - Given that the incremental stripping ratio would be around 15:1, would it be feasible to mine ore in the deep Hoodoo area once the ultimate pit limit had been reached?: It is unlikely that deep Hoodoo ore could be mined at a 15:1 stripping ratio. However, if the ore had been proven by drilling well before the ultimate pit limit was reached, and if the incremental benefits of mining it were attractive, the production schedule could be modified so that the additional stripping necessary to expose and mine this ore was conducted during an earlier phase.

R.2: Comments of Mr. Vic Miller:

A copy of the written comments of Mr. Vic Miller, Gilt Edge Mine Superintendent, is appended in Attachment R-1.

General: A discussion of ore tonnages and working slope angles is given in the responses below.

Comment 1: IMC's production schedule assumes that a stockpile of 725,000 tons of sulfide ore grading 0.048 oz/ton at a 0.025 oz/ton cutoff will be available as mill feed in Year 1. If this amount of stockpile material is not available, the mine schedule will have to be adjusted so that the shortfall is mined from the pit. The grade of the mined material will probably be lower than the grade of the stockpile material, leading to lower gold production in Year 1. In addition, the mine life will be shortened slightly by the loss of stockpile ore.

Comment 2: Bulk densities for the trachyte and quartz trachyte porphyries are based on specific gravity measurements made on six-inch metallurgical test core samples. These gave an average bulk density of 12.47 cu ft/ton for the trachyte porphyry (vs. 12.5 cu ft/ton assumed) and 11.44 cu ft/ton for the quartz trachyte porphyry (vs. 11.5 cu ft/ton assumed).

Comments 3 through 5: Acknowledged.

Comments 6 and 7: These comments, along with the observations made by Mr. Barron in his cover letter (see Section R.1 above), relate to the issues of a) how well the production schedule predicts the actual tonnages and grades of the ore that will be sent to the crusher, and b) how the project might be affected if the production schedule tonnages and grades, which are derived from the ID2 model, are found to be significantly in error.

Specifically, Mr. Miller notes that the comparisons of ID2 model predictions and blast hole data given in Table 3-6 of the report show that the ID2 model overpredicts tons by 10%. If the model consistently overpredicts tons by this amount, the stripping ratio will increase from 3.06:1 to 3.51:1 and the mining cost per ton of ore will increase by $0.38.

Mr. Miller also notes that this 10% shortfall in tons may not be offset by the fact that the model underpredicts grade by about 7%. During 1990, the average head grade (i.e. the grade of the ore actually sent to the crusher) was reportedly 6.1% lower than the average blast hole grade because of mining dilution. In this case, the model would be underestimating blast hole grade, but would be approximately correct on head grade.

While IMC recognized the potential significance of a tonnage shortfall, it nevertheless chose not to apply mining dilution factors to the model-predicted tonnages and grades that were used to prepare the production schedule. There were a variety of reasons for this. First, IMC's ore reserve reviews indicated that the ID2 model most probably understated the tonnage of mineable ore that is present in the Gilt Edge sulfide pit (see discussion in Section 3.7), which IMC believed would tend to offset any potential tonnage shortfall. Second, the sampling and assaying problems inherent in determining the true average head grade make it difficult to determine how much mining dilution is actually occurring. Third, IMC's experience on other comparable projects indicated that in cases where block model tonnage, grade and contained-ounce predictions correlate with blast hole results to within 10%, tonnages and grades derived directly from block model data generally turn out to be an acceptably close match to the head grades and tonnages achieved over the mine life.

Additional data that have become available since the production schedule was prepared have confirmed the appropriateness of this approach. A recently-completed reconciliation of ID2 model and blast hole tonnages and grades for all of the ore mined from the Sunday and Dakota Maid pits during 1990 shows that at a 0.022 oz/ton cutoff, the ID2 model predicted tonnage almost precisely, yet underestimated grade and contained ounces by over 12% - a figure which is more than twice the reported mining dilution factor for the year. The results of the comparison are summarized and discussed in a memorandum by Mr. Miller which is appended as attachment R-2.

IMC believes that the 1990 results improve the defensibility of the mine production schedule, but does not consider that any predicted-versus-mined comparisons made at this stage are likely to be sufficiently definitive to justify revising the production schedule. However, as Mr. Barron suggests in his cover letter, sensitivity analyses could be carried out to investigate the impacts of possible tonnage and grade variations. The results of the 1990 and Table 3-6 comparisons could be used to structure the criteria and assumptions for the limiting cases.

Comment 8: Acknowledged.

Comment 9: IMC's mine plan was directed towards the sulfide orebody, and the possibility of mining the Anchor Hill oxide deposit was not considered. However, the ultimate sulfide pit will indeed remove only two out of the seven existing leach pad cells, and the five remaining cells would be available if required for Anchor Hill ore. There is also spare leach pad capacity during the two years in which the pad is scheduled to take oxide ore from the sulfide pit. The ultimate pit only clips the the surge pond, and if this pond cannot be rebuilt there should be enough room to relocate it.

Comment 10: Access to the 5400 - 5460 benches during Phase 1 will be via a temporary road constructed around the north edge of the pit. This and other temporary external pit roads that will be required for excavation at and around the pit rim at various times are not shown on the figures.

Comment 11: 1) The oxide crusher could be maintained in its current location during the two years over which leaching will be conducted if the Phase II pit wall were moved south about 100 ft. However, this would require that the production schedule be modified, and without further analysis it is impossible to determine whether the savings realized by not having to move the crusher would outweigh the losses that might be incurred as a result of changing the production schedule. In any event, it is likely that the cost impacts would be comparatively minor.

2) A diversion channel could be incorporated into the final mine design.

3) Switchbacks have been designed so as to conform with the minimum turning radius of an 85-ton haul truck. Again, additional turning room could be incorporated into the final mine design if required.

Comment 12: 1) The "notches" in the final pit walls result from final floating cones which show that the amount of additional stripping required to mine these notches is paid for by the additional ore recovered from deeper levels in the pit.

2) Slope angles in the northeast part of the ultimate pit reflect the outcrop of Precambrian rocks in the pit wall. IMC's analysis of block model geologic data indicated that these rocks generally do not crop out in the pit wall above the level of the haul road. If the slope angle in the area where the pit intersects the Ruby dump poses any stability problems, the angle can be flattened without making any appreciable difference to the production schedule.

3) Haul roads outside the pit were designed on a balanced cut-and-fill basis in order to minimize earthmoving requirements. The final mine plan could address the economic and safety impacts of placing more fill in the Hoodoo exit or in other haul road intersection areas.

Comment 13: 1) IMC does not believe that rock falling from higher working benches onto lower working benches need necessarily create serious problems. Fly rock from blasting should not pose any risks because endangered pit areas will presumably have been evacuated beforehand. Kickoff will only occur during the limited amount of time when mining is being conducted at the edge of the upper bench, and the amount of kickoff generated can be minimized by appropriate operational procedures. Any kickoff that does occur during these periods will be intercepted by the existing 20ft catch benches or by haul roads, and rock falling onto haul roads can rapidly be cleared with minimal interruption to traffic flow. An additional safety margin could if necessary be obtained by increasing the width of the upper catch bench on the inter-phase pit face. This modification could be made during the final mine planning process without any significant impact on the production schedule.

2) See response to comment 3 3).

Comments 14 through 16: See previous responses.

ATTACHMENT R-1

COMMENTS OF MR. JIM BARRON & MR.VIC MILLER

BROHM MINING CORP.

February 1, 1991

Mr. Bruce Tippen
Roberts and Schaeffer
5225 Wiley Post Way #300
Salt Lake City, Utah 84116

Dear Bruce:

Enclosed are comments from Victor Miller and myself regarding the IMC draft mine feasibility study Gilt Edge expansion project for Brohm Mining Corporation dated January, 1991.

I feel as does Vic that this report was well done, and for the most part is a true and accurate portrayal of the deposit, its geology and the work that has gone into it, and IMC have delved deeply into the detail. Regarding Vic's comments about the mined versus model grades, it is his opinion that model grades overestimate the low grade portion of the deposit. I believe; 1) when we are comparing mined grades to model grades there will generally be some discrepancy; 2) when a model is plus or minus five or ten percent from actual it tends to be consered fairly good. Also, one thing to bear in mind is that last year's mined versus model grade was probably more than ten percent higher in what was mined versus the model, so there are bound to be fluctuations on the plus and minus side of predicted grade. I believe the way to best handle that situation as well as the possible mine dilution is in sensitivity analyses that could be imposed on the model. At the very least, everybody involved in this study is convinced that the mine model and mineralization model and grade prediction methods are conservative from the standpoint of not overestimating high grade material, which is where we want it to be as far as the plus or minus side of that particular aspect of this model.

If you have any questions regarding any of these comments, please let us know. As I've indicated to Rob, I will be in Tucson next week and it will be possible at that time for me to discuss any of these comments with Roger Andrews and John Bares at that time.

Sincerely,
Brohm Mining Corporation

Jim

James N. Barron
Vice President and Operations Manager

enc:
/rrl

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COMMENTS ON DRAFT MINE FEASIBILITY STUDY
GILT EDGE EXPANSION PROJECT FOR BROHM MINING CORPORATION
PREPARED FOR ROBERTS AND SCHAEFER & CO.
BY INDEPENDENT MINING CONSULTANTS (IMC), INC.
TUCSON, ARIZONA

Section 1.1, Paragraph 1. The sentence reads, "Brohm proposes to implement a 12,500 ton per day sulphide or milling operation when oxide mining ceases in about two years". I would like that changed to, "Brohm proposes to implement a 12,500 ton per day sulphide or milling operation when currently identified proven and probable oxide ore is exhausted, in about two years".

Section 3.3, Paragraph 5. The word "Gold" should be substituted with Gilt Edge (not Gold Edge).

Section 3.8, Paragraph 7. The hand calculated ore reserve was done in section only without the use of plans other than structural plans.

Section 3.8, Paragraph 8. I dispute use of the language, "one single, deep drillhole". The fact is that there are 15 drillholes within a 250-foot radius of hole R88-478, or the high-grade hole. The average depth of those 15 holes is 977 feet. There is a resource which is not defined by one single deep drillhole.

Section 3.10, Paragraph 2. The sentence, "However, mineable ore reserve calculations are not greatly impacted by deep resources and the potentially suspect mineralization in the deep Hoodoo area" that was discussed in the previous section have been eliminated from consideration in calculating mineable tonnages. I would like to see the words "potentially suspect" substituted with "as yet poorly identified" mineralization.

/rrl

DATE: JANUARY 28, 1991

TO: JIM BARRON

FROM: VICTOR MILLER

SUBJECT: COMMENTS ON THE IMC SULFIDE MINE DESIGNS AND SCHEDULES

General

Overall, I was very pleased with the work. The designs did a good job of integrating the pit phases and the waste dumps. The detailed haulage profile analysis checked to within $0.01 of those done at Brohm. The observation that the mineral model may be conservative is important and future models will examine unestimated blocks closely.

There were a number of design items that could have an overall negative effect on the resulting production schedules. First, comparisons of the actual oxide production with the mineral model indicate that the model overestimates the marginal grade ore (.020-.025). For the 1991 oxide production schedules, a model .022 cutoff was used because it was the best estimator of actual tonnage at a .020 cutoff. Thus, since IMC used a .022 cutoff to estimate an actual .022 cutoff, the schedule ore tonnage may be overestimated by 5% to 10%. Secondly, the Phase I and II designs used a 53% intraramp slope angle. Many mines use a much shallower working slope angle because the mining of one phase will interfere with an earlier phase due to rocks blasted into it. As designed, IMC phases do not allow for this and it will be very difficult to safely mine in Phase I and II while stripping the next phases over them.

Text Comments

Section 2.3, 3rd Paragraph.

IMC was given a sulfide stockpile resulting from oxide mining of 610,000 tons at a .0495 oz/t grade. The mine is very tight on room to place this material, so a .030 cutoff grade will be used. Unless a technical revision is approved by the state, there may be no sulfide ore stockpiles, so it is to the mine's advantage to minimize the stockpile.

Section 3.6.

Mineralogically, the quartz trachyte porphyry is very similar to the trachyte porphyry. The only difference is the latter is more mineralized and fractured. I would be more comfortable with a 5% difference in densities rather than a 10% difference.

Section 3.7, 7th Paragraph.

On the 5420 bench, we observed ore grade mineralization bleeding into about 50' of the quartz trachyte stock. This observation may be true at least some of the time, but there is substantial drilling data that suggest other areas the contact is sharp.

Section 3.7, 6th Paragraph.

The next model of this will be looked at closely.

Section 3.7, 13th Paragraph.

The deeper Hoodoo area was not used in Brohm's mine design for the same reason. Because of the limited high grade nature of this area, it was found to require a 15:1 strip ratio which consumed most of the ore's value and left very little for profit.

Section 3.9, 2nd Paragraph.

If a sensitivity analysis is performed on this project, the loss of 10% of the ore tons would change the stripping ratio form 3.05:1 to 3.51:1. This would add $0.38 per ton to the ore production cost.

Section 3.9, 3rd Paragraph.

Is overestimating ore tonnage by 10% significant?

Section 4.1.

All of IMC cones are very similar to Brohm's. Since the ultimate pit does not change significantly between $400 and $500 gold price, the largest change in reserves will occur due to cutoff grade rather than pit configuration.

Section 4.3.4.

When the southern portion of the leach pad is cut by the sulfide pit, a new dike could be constructed and Cells 1-5 maintained as operable. The biggest loss would be the 7 million gallon surge pond.

At $460 gold, it may be possible to justify mining 2-3 million tons of oxide ore from the Anchor Hill area. If so, this may either precede the sulfide project or be used to supplement the sulfide pit oxide ores in year three plus.

Phase I Design.

1) How are the 5400 to 5460 benches going to be accessed?

Phase II Design.

1) The east 90^{o} corner could be modified to avoid mining the oxide crusher area.
2) A water diversion will be needed along the west side between elevation 5300-5440.
3) The switchback design is poor. I prefer adding at least 50 feet to the width, so a minimum 25' inside radius at a 3% grade is possible.

Figure 4-3 Ultimate Pit End 10 Years.

1) On the north wall between 5040 and the surface, a small 5040 notch becomes 1/2 million tons of waste mining. Could this be a figment of the cone's imagination or some strange geometries between a 45^{o} and 53^{o} slope?
2) The northeast pit will slope angle of 45^{o} should be extended to the 5480 elevation. Some of this wall also intersects the oxide Ruby waste dump, where a 37^{o} slope angle would be appropriate.
3) The pit exit to the 5400 waste dump road could be modified by placing more fill into the Hoodoo area. This may help the cycle time for waste.

Figure 4-8 End Year 1.

1) Northeast side of Phase I is designed at 53%. Rock kicked off or blasted off from Phase II will cause a major problem.
2) The 5440 3-way road intersection could be redesigned for better safety and less traffic slowing.

Figure 4-9 End Year 2.

1) In switchback areas, an addition 50' width is needed for a 25' inside radius.

Figure 4-1 End Year 3.

1) The steep pit slope between Phase 3 and 2 will cause problems.

Figure 4-11 End Year 5.

1) The 5140 and 5280 switchbacks are too tight.
2) The southeast Phase II pit wall is too steep to allow Phase III mining above it.

/rrl

ATTACHMENT R-2

GILT EDGE 1990 ORE RECONCILIATION

DATE: JANUARY 30, 1991

TO: JIM BARRON

FROM: VIC MILLER

SUBJECT: 1990 ORE RECONCILIATION

1.0 GENERAL

Table 1 shows the blast hole versus mineral model reserve reconciliation for the ore that was mined in 1990. The model [illegible] were summarized for the Dakota Maid and Sunday Pit areas separately, for each [illegible] [illegible]ed, and at two model cutoffs, .020 and .022. The .022 cutoff was used because [illegible] [illegible]ciliations showed that a model summary at .022 was a better estimator of ac[illegible] [illegible]ge at a .020 cutoff.

For each area and bench mined in [illegible] [illegible] estimate was made of the actual ore [illegible] and grade mined. This was done by averaging the blast hole fire assays within the actual tonnage that were designated as plus .020 ore. This is different than the official reported mined ore tonnage and grade, where the tonnage is a function of trucks actually sent to [illegible] ore stockpiles and the grade is adjusted for pit dilution by averaging some of the marginal blast hole assays around the fringe of the ore areas. Note that nondiluted blast h[illegible] estimate grade was .0491 oz/ton, while the official reported mined grade for 1990 was [illegible] oz/ton resulting in a net 6.1% dilution built into the official 1990 reported grade.

[illegible] SUNDAY PIT

As a tonnage estimator for the .022 model cutoff predicted, the actual Sunday [illegible] was within 15,000 tons or 1/4%, while the .020 [illegible] cutoff over [illegible] by 116,000 tons or 11%. For this reason, a .022 model cutoff [illegible] waste mining schedule.

Although the .022 model cutoff was a better grade predictor [illegible] underestimated the undiluted grade by 9.2% and 13.5%, [illegible] report discusses some possible explanations [illegible] grade estimating

3.0 DAKOTA MAID

Because of the low tonnage mined in the Dakota Maid area, there is a good chance that the comparison of tonnage and grade was biased by local anomalities that would be offset over larger tonnages. Following is a summary of the generally poor model versus actual comparisons for the Dakota Maid:

-----ACTUAL-----		-----MODEL .020-----		-----MODEL .022-----	
KTon	Grade	KTon	Grade	KTon	Grade
193.1	56.1	242.0	36.1	209.0	38.3
% Diff (Mod./Act.)		125.3%	64.3%	108.2%	68.3%

The main reason for the above poor model performance is that a well defined high grade zone occurred in the mined portion of the Dakota Maid pit and the grade and tonnage of this zone was underestimated by the model. For example, on the 5460 bench, the model predicted 11,100 tons in the zone at a .090 oz/ton grade while the zone produced 11,000 tons at a .174 oz/ton grade. Hopefully, over a larger tonnage there would be zones where the reverse would be true, thus reducing the net difference.

4.0 DENSITY

Recent work by IMC indicates that the following inplace rock density should be used:

--------TYPE--------	---------------FT^3/TON ORE---------------	
	-----MIXED ORE-----	-----OXIDE ORE-----
Trachyte Porphyry, Breccia	12.8	13.1
Quartz Trachyte Porphyry	11.4	11.[illegible]
Deadwood Formation, Average	11.7	12.0

For this comparison, a 13.5 ft^3/ton was used both in the model and for the actual production tonnage estimate, so any density change would not affect the mined tonnage versus crusher weightometer comparison.

Before a mined versus crusher comparison can be made, the net change in the ROM stockpile needs to be accounted for. From the beginning to the end of 1990, the net change in the ROM stockpile was -20,031 tons (86,531 on January 1, 66,500 on December 31), thus the net 1990 mined ore delivered to the crusher plus ROM ore was 1,290,531 tons (1,270,500 + 20,031) compared to a crusher weightometer of 1,321,400tons. The 30,900 ton difference (2.3% increase) could be accounted for by a slightly higher inpit density or it could be due to standard errors in trying to determine each tonnage estimate.

5.0 SULFIDE-MIXED-OXIDE

For the sulfide ore, the model predicted 24,000 tons in 1990 while the mine produced 65,000 tons. Considering that many of the 1990 sulfide sources were small blebs 10 to 30 feet across, it is not surprising that predicting these with 100 foot wide spaced drill holes is a geologic challenge.

There is not an actual mined "mixed" ore category based on the blast holes. Some of the "mixed" model ore probably contributed to the sulfide stockpile. The rest, depending on how much sulfide was present, was shipped as oxide ore. Some that fell between the .030 sulfide cutoff and .020 oxide cutoff that had greater than 50% of the material unoxidized went to the waste dump.

In 1990, only a small percentage (5%) of the mined gold bearing rock was classified as mixed ore in the model. However, in 1991 as mining skims along the oxide/sulfide boundary in several places, the mixed ore will account for 33% of the scheduled mine production. Besides lowering the recovery, this will make next year's reconciliation very difficult. The oxide/sulfide determination creates a paradox for the mineral model. That is, it can be correct in gold grade but incorrect in mineral type. With the density of exploration drilling, the risk associated with the somewhat subjective oxide/sulfide estimation probably exceeds the possible error in estimating the gold grade.

6.0 HIGH GRADE PODS

Figure 1 shows a typical high grade pod. Generally, its horizontal dimensions are less than the drill hole spacing, so unless the exploration hole happens to intersect the pod, it remains hidden to the model. Additionally, if intersected, the estimated grade is diluted by all the assays from the nearby exploration drilling. The net result is that the model underestimates the actual mined grade. The extreme example of this is in the Dakota Maid discussed in Section 3.

Geostatistically, there are some techniques that might help, but the model cannot project estimated block grades without some assay data (i.e., 50' exploration drill hole spacing which is not practical).

7.0 EFFECT ON SULFIDE PROJECT

In the areas mined in 1990, some of the original high grade pods have been mined previously by underground methods. Where undisturbed, these pods are more uniform in their high grade nature and seem to exhibit distinct boundaries. If underground mining hadn't removed some of the high grade ore, the actual versus model grade comparison could be expected to be larger in the 1990 reconciliation.

It can be concluded that the present mineral model overestimates the low grade .025-.020 oz/ton tonnage and underestimates the tonnage and grade of the high grade pods. The overestimation of the marginal ore can be corrected, by using low grade or waste indicator kriging, so a .020 model cutoff tonnage correctly estimates the actual .020 mine ore tonnage. The high grade ore is a much more difficult problem, and will have to be seriously investigated.

8.0 COMPENSATING ERRORS IN GRADE ESTIMATE

On Table 1, the estimated .022 cutoff 1990 grade was .0427 oz/ton and the official crushed grade for the year was .042 oz/ton. The actual mined grade without dilution based on the average of nearly 5,000 blast holes was .0491 oz/ton. If the real dilution was 10%, the grade sent to the crusher would have been .0446 oz/ton, which is 6% higher than the official crusher grade. Some of the difference may be due to some low bias in the crusher samples and possibly some high bias in the fire blasthole assays. Note that only about 10% of the blast hole assays were actually fire and the rest were adjusted based on statistical analysis of the fire/assay relationship. If this is so, the two bias may compensate for each estimate, thus making the predicted grade of .022 model cutoff a good estimator of the future oxide crusher grade.

If the true crusher grade was in reality .003 oz/ton higher, this would not have any effect on future gold production because the previous historical recovery was based on the possibly biased crusher head grade. Thus, a predicted higher head grade would be offset by a revised lower recovery.

/rrl

TABLE 1
BROHM MINING CORP. GILT EDGE MINE
1990 MINING RECONCILIATION

VJK 1/30/90

BENCH	TYPE	SUNDAY AREA KTON	SUNDAY AREA MOZ/T	SUNDAY AREA OZ.	DAKOTA MAID AREA KTON	DAKOTA MAID AREA MOZ/T	DAKOTA MAID AREA OZ.	TOTAL ORE KTON	TOTAL ORE MOZ/T	TOTAL ORE OZ.
5520	ACT. BH	0.0	0.0	0	29.3	38.3	1122	29.3	38.3	1122
	MOD >20	0.0	0.0	0	34.0	24.0	816	34.0	24.0	816
	MOD >22	0.0	0.0	0	27.0	25.0	675	27.0	25.0	675
5500	ACT. BH	19.1	55.7	1064	35.0	48.8	1708	54.1	51.2	2772
	MOD >20	19.0	38.0	722	49.0	26.9	1318	68.0	30.0	2040
	MOD >22	14.0	44.0	616	40.0	27.8	1112	54.0	32.0	1728
5480	ACT. BH	341.2	46.0	15695	42.8	54.7	2341	384.0	47.0	18036
	MOD >20	373.0	42.0	15666	59.0	42.0	2478	432.0	42.0	18144
	MOD >22	333.0	44.0	14652	48.0	44.0	2112	381.0	44.0	16764
5460	ACT. BH	256.9	51.0	13102	61.4	71.0	4359	318.3	54.9	17461
	MOD >20	345.0	40.0	13800	76.0	45.5	3461	421.0	41.0	17261
	MOD >22	299.0	43.0	12857	70.0	48.3	3379	369.0	44.0	16236
5440	ACT. BH	257.6	44.9	11566	24.5	35.4	867	282.1	44.1	12434
	MOD >20	284.0	40.0	11360	24.0	27.2	652	308.0	39.0	12012
	MOD >22	255.0	42.0	10710	24.0	30.4	729	279.0	41.0	11439
5420	ACT. BH	202.6	50.8	10292	0.0	0.0	0	202.6	50.8	10292
	MOD >20	173.0	45.0	7785	0.0	0.0	0	173.0	45.0	7785
	MOD >22	161.0	46.0	7406	0.0	0.0	0	161.0	46.0	7406
TOTAL	ACT. BH	1077.4	48.0	51719	193.0	53.9	10398	1270.4	48.9	62117
	MOD >20	1194.0	41.3	49333	242.0	36.1	8725	1436.0	40.4	58058
	MOD >22	1062.0	43.5	46241	209.0	38.3	8007	1271.0	42.7	54248
OFFICAL MINED	TOTAL	1077.4	(1) 45.6	49164	193.1	(1) 51.4	9922	1270.5	(1) 46.5	59086
OFFICAL CRUSHED	TOTAL							(2) 1321.4	42.0	55500

(1) FRINGE DILUTION WAS ADDED IN THE OFFICAL MINED GRADE ESTIMATE
(2) TONNAGE DIFFERENCE DUE TO CHANGES IN ROM STOCKPILE (20,000 T), STANDARD ESTIMATION VARIANCE, AND POSSIBLY MINOR DENSITY CHANGES

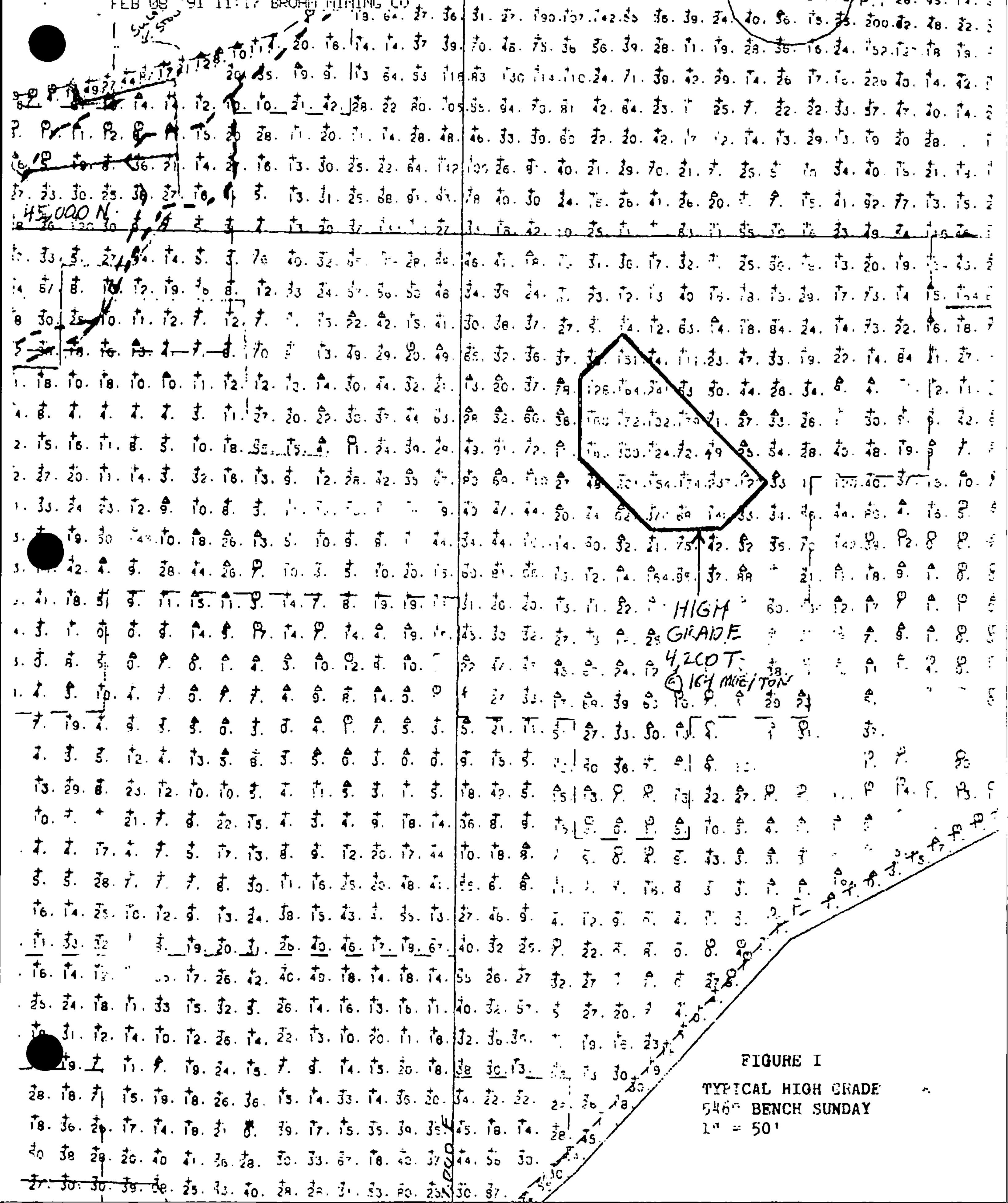

FIGURE I

TYPICAL HIGH GRADE
5460 BENCH SUNDAY
1" = 50'

APPENDIX R

RESPONSE TO COMMENTS

R.1: <u>Comments of Mr. Jim Barron</u>:

A copy of the written comments of Mr. Jim Barron, Vice President and Operations Manager of the Gilt Edge mine, is appended in Attachment R-1.

General: Mr. Barron's comments on the accuracy of the orebody model are discussed in the response to Mr. Miller's comments 6 and 7 in Section R.2 below.

Comments 1 through 5: Text of report modified.

Verbal question - Does IMC see any differences that would warrant a separate statistical treatment of oxide, mixed and sulfide ore?: Based on the information available, it appears that the distribution of gold remains effectively the same regardless of ore type, and as long as there is no change in the rock type or the structural environment. Gold grades are reported as being slightly higher at depth than in the shallow, more oxidized zones, and mineable grades are slightly higher in the sulfide than in the oxide material, but IMC does not consider these differences to be significant. On this basis, IMC believes that it is appropriate to treat oxide, sulfide and mixed material in the same statistical manner.

Verbal question - Given that the incremental stripping ratio would be around 15:1, would it be feasible to mine ore in the deep Hoodoo area once the ultimate pit limit had been reached?: It is unlikely that deep Hoodoo ore could be mined at a 15:1 stripping ratio. However, if the ore had been proven by drilling well before the ultimate pit limit was reached, and if the incremental benefits of mining it were attractive, the production schedule could be modified so that the additional stripping necessary to expose and mine this ore was conducted during an earlier phase.

R.2: Comments of Mr. Vic Miller:

A copy of the written comments of Mr. Vic Miller, Gilt Edge Mine Superintendent, is appended in Attachment R-1.

General: A discussion of ore tonnages and working slope angles is given in the responses below.

Comment 1: IMC's production schedule assumes that a stockpile of 725,000 tons of sulfide ore grading 0.048 oz/ton at a 0.025 oz/ton cutoff will be available as mill feed in Year 1. If this amount of stockpile material is not available, the mine schedule will have to be adjusted so that the shortfall is mined from the pit. The grade of the mined material will probably be lower than the grade of the stockpile material, leading to lower gold production in Year 1. In addition, the mine life will be shortened slightly by the loss of stockpile ore.

Comment 2: Bulk densities for the trachyte and quartz trachyte porphyries are based on specific gravity measurements made on six-inch metallurgical test core samples. These gave an average bulk density of 12.47 cu ft/ton for the trachyte porphyry (vs. 12.5 cu ft/ton assumed) and 11.44 cu ft/ton for the quartz trachyte porphyry (vs. 11.5 cu ft/ton assumed).

Comments 3 through 5: Acknowledged.

Comments 6 and 7: These comments, along with the observations made by Mr. Barron in his cover letter (see Section R.1 above), relate to the issues of a) how well the production schedule predicts the actual tonnages and grades of the ore that will be sent to the crusher, and b) how the project might be affected if the production schedule tonnages and grades, which are derived from the ID2 model, are found to be significantly in error.

Specifically, Mr. Miller notes that the comparisons of ID2 model predictions and blast hole data given in Table 3-6 of the report show that the ID2 model overpredicts tons by 10%. If the model consistently overpredicts tons by this amount, the stripping ratio will increase from 3.06:1 to 3.51:1 and the mining cost per ton of ore will increase by $0.38.

Mr. Miller also notes that this 10% shortfall in tons may not be offset by the fact that the model underpredicts grade by about 7%. During 1990, the average head grade (i.e. the grade of the ore actually sent to the crusher) was reportedly 6.1% lower than the average blast hole grade because of mining dilution. In this case, the model would be underestimating blast hole grade, but would be approximately correct on head grade.

While IMC recognized the potential significance of a tonnage shortfall, it nevertheless chose not to apply mining dilution factors to the model-predicted tonnages and grades that were used to prepare the production schedule. There were a variety of reasons for this. First, IMC's ore reserve reviews indicated that the ID2 model most probably understated the tonnage of mineable ore that is present in the Gilt Edge sulfide pit (see discussion in Section 3.7), which IMC believed would tend to offset any potential tonnage shortfall. Second, the sampling and assaying problems inherent in determining the true average head grade make it difficult to determine how much mining dilution is actually occurring. Third, IMC's experience on other comparable projects indicated that in cases where block model tonnage, grade and contained-ounce predictions correlate with blast hole results to within 10%, tonnages and grades derived directly from block model data generally turn out to be an acceptably close match to the head grades and tonnages achieved over the mine life.

Additional data that have become available since the production schedule was prepared have confirmed the appropriateness of this approach. A recently-completed reconciliation of ID2 model and blast hole tonnages and grades for all of the ore mined from the Sunday and Dakota Maid pits during 1990 shows that at a 0.022 oz/ton cutoff, the ID2 model predicted tonnage almost precisely, yet underestimated grade and contained ounces by over 12% - a figure which is more than twice the reported mining dilution factor for the year. The results of the comparison are summarized and discussed in a memorandum by Mr. Miller which is appended as attachment R-2.

IMC believes that the 1990 results improve the defensibility of the mine production schedule, but does not consider that any predicted-versus-mined comparisons made at this stage are likely to be sufficiently definitive to justify revising the production schedule. However, as Mr. Barron suggests in his cover letter, sensitivity analyses could be carried out to investigate the impacts of possible tonnage and grade variations. The results of the 1990 and Table 3-6 comparisons could be used to structure the criteria and assumptions for the limiting cases.

Comment 8: Acknowledged.

Comment 9: IMC's mine plan was directed towards the sulfide orebody, and the possibility of mining the Anchor Hill oxide deposit was not considered. However, the ultimate sulfide pit will indeed remove only two out of the seven existing leach pad cells, and the five remaining cells would be available if required for Anchor Hill ore. There is also spare leach pad capacity during the two years in which the pad is scheduled to take oxide ore from the sulfide pit. The ultimate pit only clips the the surge pond, and if this pond cannot be rebuilt there should be enough room to relocate it.

Comment 10: Access to the 5400 - 5460 benches during Phase 1 will be via a temporary road constructed around the north edge of the pit. This and other temporary external pit roads that will be required for excavation at and around the pit rim at various times are not shown on the figures.

Comment 11: 1) The oxide crusher could be maintained in its current location during the two years over which leaching will be conducted if the Phase II pit wall were moved south about 100 ft. However, this would require that the production schedule be modified, and without further analysis it is impossible to determine whether the savings realized by not having to move the crusher would outweigh the losses that might be incurred as a result of changing the production schedule. In any event, it is likely that the cost impacts would be comparatively minor.

2) A diversion channel could be incorporated into the final mine design.

3) Switchbacks have been designed so as to conform with the minimum turning radius of an 85-ton haul truck. Again, additional turning room could be incorporated into the final mine design if required.

Comment 12: 1) The "notches" in the final pit walls result from final floating cones which show that the amount of additional stripping required to mine these notches is paid for by the additional ore recovered from deeper levels in the pit.

2) Slope angles in the northeast part of the ultimate pit reflect the outcrop of Precambrian rocks in the pit wall. IMC's analysis of block model geologic data indicated that these rocks generally do not crop out in the pit wall above the level of the haul road. If the slope angle in the area where the pit intersects the Ruby dump poses any stability problems, the angle can be flattened without making any appreciable difference to the production schedule.

3) Haul roads outside the pit were designed on a balanced cut-and-fill basis in order to minimize earthmoving requirements. The final mine plan could address the economic and safety impacts of placing more fill in the Hoodoo exit or in other haul road intersection areas.

Comment 13: 1) IMC does not believe that rock falling from higher working benches onto lower working benches need necessarily create serious problems. Fly rock from blasting should not pose any risks because endangered pit areas will presumably have been evacuated beforehand. Kickoff will only occur during the limited amount of time when mining is being conducted at the edge of the upper bench, and the amount of kickoff generated can be minimized by appropriate operational procedures. Any kickoff that does occur during these periods will be intercepted by the existing 20ft catch benches or by haul roads, and rock falling onto haul roads can rapidly be cleared with minimal interruption to traffic flow. An additional safety margin could if necessary be obtained by increasing the width of the upper catch bench on the inter-phase pit face. This modification could be made during the final mine planning process without any significant impact on the production schedule.

2) See response to comment 3 3).

Comments 14 through 16: See previous responses.

ATTACHMENT R-1

COMMENTS OF MR. JIM BARRON & MR.VIC MILLER

BROHM MINING CORP.

February 1, 1991

Mr. Bruce Tippen
Roberts and Schaeffer
5225 Wiley Post Way #300
Salt Lake City, Utah 84116

Dear Bruce:

Enclosed are comments from Victor Miller and myself regarding the IMC draft mine feasibility study Gilt Edge expansion project for Brohm Mining Corporation dated January, 1991.

I feel as does Vic that this report was well done, and for the most part is a true and accurate portrayal of the deposit, its geology and the work that has gone into it, and IMC have delved deeply into the detail. Regarding Vic's comments about the mined versus model grades, it is his opinion that model grades overestimate the low grade portion of the deposit. I believe; 1) when we are comparing mined grades to model grades there will generally be some discrepancy; 2) when a model is plus or minus five or ten percent from actual it tends to be consered fairly good. Also, one thing to bear in mind is that last year's mined versus model grade was probably more than ten percent higher in what was mined versus the model, so there are bound to be fluctuations on the plus and minus side of predicted grade. I believe the way to best handle that situation as well as the possible mine dilution is in sensitivity analyses that could be imposed on the model. At the very least, everybody involved in this study is convinced that the mine model and mineralization model and grade prediction methods are conservative from the standpoint of not overestimating high grade material, which is where we want it to be as far as the plus or minus side of that particular aspect of this model.

If you have any questions regarding any of these comments, please let us know. As I've indicated to Rob, I will be in Tucson next week and it will be possible at that time for me to discuss any of these comments with Roger Andrews and John Bares at that time.

Sincerely,
Brohm Mining Corporation

Jim

James N. Barron
Vice President and Operations Manager

enc:
/rrl

COMMENTS ON DRAFT MINE FEASIBILITY STUDY
GILT EDGE EXPANSION PROJECT FOR BROHM MINING CORPORATION
PREPARED FOR ROBERTS AND SCHAEFER & CO.
BY INDEPENDENT MINING CONSULTANTS (IMC), INC.
TUCSON, ARIZONA

Section 1.1, Paragraph 1. The sentence reads, "Brohm proposes to implement a 12,500 ton per day sulphide or milling operation when oxide mining ceases in about two years". I would like that changed to, "Brohm proposes to implement a 12,500 ton per day sulphide or milling operation when currently identified proven and probable oxide ore is exhausted, in about two years".

Section 3.3, Paragraph 5. The word "Gold" should be substituted with Gilt Edge (not Gold Edge).

Section 3.8, Paragraph 7. The hand calculated ore reserve was done in section only without the use of plans other than structural plans.

Section 3.8, Paragraph 8. I dispute use of the language, "one single, deep drillhole". The fact is that there are 15 drillholes within a 250-foot radius of hole R88-478, or the high-grade hole. The average depth of those 15 holes is 977 feet. There is a resource which is not defined by one single deep drillhole.

Section 3.10, Paragraph 2. The sentence, "However, mineable ore reserve calculations are not greatly impacted by deep resources and the potentially suspect mineralization in the deep Hoodoo area" that was discussed in the previous section have been eliminated from consideration in calculating mineable tonnages. I would like to see the words "potentially suspect" substituted with "as yet poorly identified" mineralization.

/rrl

DATE: JANUARY 28, 1991

TO: JIM BARRON

FROM: VICTOR MILLER

SUBJECT: COMMENTS ON THE IMC SULFIDE MINE DESIGNS AND SCHEDULES

General

Overall, I was very pleased with the work. The designs did a good job of integrating the pit phases and the waste dumps. The detailed haulage profile analysis checked to within $0.01 of those done at Brohm. The observation that the mineral model may be conservative is important and future models will examine unestimated blocks closely.

There were a number of design items that could have an overall negative effect on the resulting production schedules. First, comparisons of the actual oxide production with the mineral model indicate that the model overestimates the marginal grade ore (.020-.025). For the 1991 oxide production schedules, a model .022 cutoff was used because it was the best estimator of actual tonnage at a .020 cutoff. Thus, since IMC used a .022 cutoff to estimate an actual .022 cutoff, the schedule ore tonnage may be overestimated by 5% to 10%. Secondly, the Phase I and II designs used a 53% intraramp slope angle. Many mines use a much shallower working slope angle because the mining of one phase will interfere with an earlier phase due to rocks blasted into it. As designed, IMC phases do not allow for this and it will be very difficult to safely mine in Phase I and II while stripping the next phases over them.

Text Comments

Section 2.3, 3rd Paragraph.

IMC was given a sulfide stockpile resulting from oxide mining of 610,000 tons at a .0495 oz/t grade. The mine is very tight on room to place this material, so a .030 cutoff grade will be used. Unless a technical revision is approved by the state, there may be no sulfide ore stockpiles, so it is to the mine's advantage to minimize the stockpile.

Section 3.6.

Mineralogically, the quartz trachyte porphyry is very similar to the trachyte porphyry. The only difference is the latter is more mineralized and fractured. I would be more comfortable with a 5% difference in densities rather than a 10% difference.

Section 3.7, 7th Paragraph.

On the 5420 bench, we observed ore grade mineralization bleeding into about 50' of the quartz trachyte stock. This observation may be true at least some of the time, but there is substantial drilling data that suggest other areas the contact is sharp.

Section 3.7, 6th Paragraph.

The next model of this will be looked at closely.

Section 3.7, 13th Paragraph.

The deeper Hoodoo area was not used in Brohm's mine design for the same reason. Because of the limited high grade nature of this area, it was found to require a 15:1 strip ratio which consumed most of the ore's value and left very little for profit.

Section 3.9, 2nd Paragraph.

If a sensitivity analysis is performed on this project, the loss of 10% of the ore tons would change the stripping ratio form 3.05:1 to 3.51:1. This would add $0.38 per ton to the ore production cost.

Section 3.9, 3rd Paragraph.

Is overestimating ore tonnage by 10% significant?

Section 4.1.

All of IMC cones are very similar to Brohm's. Since the ultimate pit does not change significantly between $400 and $500 gold price, the largest change in reserves will occur due to cutoff grade rather than pit configuration.

Section 4.3.4.

When the southern portion of the leach pad is cut by the sulfide pit, a new dike could be constructed and Cells 1-5 maintained as operable. The biggest loss would be the 7 million gallon surge pond.

At $460 gold, it may be possible to justify mining 2-3 million tons of oxide ore from the Anchor Hill area. If so, this may either precede the sulfide project or be used to supplement the sulfide pit oxide ores in year three plus.

Phase I Design.

1) How are the 5400 to 5460 benches going to be accessed?

Phase II Design.

1) The east 90^{o} corner could be modified to avoid mining the oxide crusher area.
2) A water diversion will be needed along the west side between elevation 5300-5440.
3) The switchback design is poor. I prefer adding at least 50 feet to the width, so a minimum 25' inside radius at a 3% grade is possible.

Figure 4-3 Ultimate Pit End 10 Years.

1) On the north wall between 5040 and the surface, a small 5040 notch becomes 1/2 million tons of waste mining. Could this be a figment of the cone's imagination or some strange geometries between a 45^{o} and 53^{o} slope?
2) The northeast pit will slope angle of 45^{o} should be extended to the 5480 elevation. Some of this wall also intersects the oxide Ruby waste dump, where a 37^{o} slope angle would be appropriate.
3) The pit exit to the 5400 waste dump road could be modified by placing more fill into the Hoodoo area. This may help the cycle time for waste.

Figure 4-8 End Year 1.

1) Northeast side of Phase I is designed at 53%. Rock kicked off or blasted off from Phase II will cause a major problem.
2) The 5440 3-way road intersection could be redesigned for better safety and less traffic slowing.

Figure 4-9 End Year 2.

1) In switchback areas, an addition 50' width is needed for a 25' inside radius.

Figure 4-1 End Year 3.

1) The steep pit slope between Phase 3 and 2 will cause problems.

Figure 4-11 End Year 5.

1) The 5140 and 5280 switchbacks are too tight.
2) The southeast Phase II pit wall is too steep to allow Phase III mining above it.

/rrl

ATTACHMENT R-2

GILT EDGE 1990 ORE RECONCILIATION

DATE: JANUARY 30, 1991

TO: JIM BARRON

FROM: VIC MILLER

SUBJECT: 1990 ORE RECONCILIATION

1.0 GENERAL

Table 1 shows the blast hole versus mineral model reserve reconciliation for the ore that was mined in 1990. The model ... were summarized for the Dakota Maid and Sunday Pit areas separately. For each ... ed, and at two model cutoffs, .020 and .022. The .022 cutoff was used because ... iliations showed that a model summary at .022 was a better estimator of ac... ge at a .020 cutoff.

For each area and bench mined in ... estimate was made of the actual ore ... and grade mined. This was done by averaging the blast hole fire assays within the actual tonnage that were designated as plus .020 ore. This is different than the official reported mined ore tonnage and grade, where the tonnage is a function of trucks actually sent to ... ore stockpiles and the grade is adjusted for pit dilution by averaging some of the marginal blast hole assays around the fringe of the ore areas. Note that nondiluted blast ... estimate grade was .0491 oz/ton, while the official reported mined grade for 1990 was ... oz/ton resulting in a net 6.1% dilution built into the official 1990 reported grade.

... SUNDAY PIT

As a tonnage estimator for the .022 model cutoff predicted, the actual Sunday ... was within 15,000 tons or 1/4%, while the .020 ... cutoff over ... by 116,000 tons or 11%. For this reason, a .022 model cut... waste mining schedule.

Although the .022 model cutoff was a better grade predictor ... underestimated the undiluted grade by 9.2% and 12.8%, res... report discusses some possible explanations ... grade estimating

3.0 DAKOTA MAID

Because of the low tonnage mined in the Dakota Maid area, there is a good chance that the comparison of tonnage and grade was biased by local anomalities that would be offset over larger tonnages. Following is a summary of the generally poor model versus actual comparisons for the Dakota Maid:

-----ACTUAL----- KTon	Grade	-----MODEL .020----- KTon	Grade	-----MODEL .022----- KTon	Grade
193.1	56.1	242.0	36.1	209.0	38.3
% Diff (Mod./Act.)		125.3%	64.3%	108.2%	68.3%

The main reason for the above poor model performance is that a well defined high grade zone occurred in the mined portion of the Dakota Maid pit and the grade and tonnage of this zone was underestimated by the model. For example, on the 5460 bench, the model predicted 11,100 tons in the zone at a .090 oz/ton grade while the zone produced 11,000 tons at a .174 oz/ton grade. Hopefully, over a larger tonnage there would be zones where the reverse would be true, thus reducing the net difference.

4.0 DENSITY

Recent work by IMC indicates that the following inplace rock density should be used:

--------TYPE--------	---------------FT³/TON ORE--------------- -----MIXED ORE-----	-----OXIDE ORE-----
Trachyte Porphyry, Breccia	12.8	13.1
Quartz Trachyte Porphyry	11.4	11.[illegible]
Deadwood Formation, Average	11.7	12.0

For this comparison, a 13.5 ft^3/ton was used both in the model and for the actual production tonnage estimate, so any density change would not affect the mined tonnage versus crusher weightometer comparison.

Before a mined versus crusher comparison can be made, the net change in the ROM stockpile needs to be accounted for. From the beginning to the end of 1990, the net change in the ROM stockpile was -20,031 tons (86,531 on January 1, 66,500 on December 31), thus the net 1990 mined ore delivered to the crusher plus ROM ore was 1,290,531 tons (1,270,500 + 20,031) compared to a crusher weightometer of 1,321,400tons. The 30,900 ton difference (2.3% increase) could be accounted for by a slightly higher inpit density or it could be due to standard errors in trying to determine each tonnage estimate.

5.0 SULFIDE-MIXED-OXIDE

For the sulfide ore, the model predicted 24,000 tons in 1990 while the mine produced 65,000 tons. Considering that many of the 1990 sulfide sources were small blebs 10 to 30 feet across, it is not surprising that predicting these with 100 foot wide spaced drill holes is a geologic challenge.

There is not an actual mined "mixed" ore category based on the blast holes. Some of the "mixed" model ore probably contributed to the sulfide stockpile. The rest, depending on how much sulfide was present, was shipped as oxide ore. Some that fell between the .030 sulfide cutoff and .020 oxide cutoff that had greater than 50% of the material unoxidized went to the waste dump.

In 1990, only a small percentage (5%) of the mined gold bearing rock was classified as mixed ore in the model. However, in 1991 as mining skims along the oxide/sulfide boundary in several places, the mixed ore will account for 33% of the scheduled mine production. Besides lowering the recovery, this will make next year's reconciliation very difficult. The oxide/sulfide determination creates a paradox for the mineral model. That is, it can be correct in gold grade but incorrect in mineral type. With the density of exploration drilling, the risk associated with the somewhat subjective oxide/sulfide estimation probably exceeds the possible error in estimating the gold grade.

6.0 HIGH GRADE PODS

Figure 1 shows a typical high grade pod. Generally, its horizontal dimensions are less than the drill hole spacing, so unless the exploration hole happens to intersect the pod, it remains hidden to the model. Additionally, if intersected, the estimated grade is diluted by all the assays from the nearby exploration drilling. The net result is that the model underestimates the actual mined grade. The extreme example of this is in the Dakota Maid discussed in Section 3.

Geostatistically, there are some techniques that might help, but the model cannot project estimated block grades without some assay data (i.e., 50' exploration drill hole spacing which is not practical).

7.0 EFFECT ON SULFIDE PROJECT

In the areas mined in 1990, some of the original high grade pods have been mined previously by underground methods. Where undisturbed, these pods are more uniform in their high grade nature and seem to exhibit distinct boundaries. If underground mining hadn't removed some of the high grade ore, the actual versus model grade comparison could be expected to be larger in the 1990 reconciliation.

It can be concluded that the present mineral model overestimates the low grade .025-.020 oz/ton tonnage and underestimates the tonnage and grade of the high grade pods. The overestimation of the marginal ore can be corrected, by using low grade or waste indicator kriging, so a .020 model cutoff tonnage correctly estimates the actual .020 mine ore tonnage. The high grade ore is a much more difficult problem, and will have to be seriously investigated.

8.0 COMPENSATING ERRORS IN GRADE ESTIMATE

On Table 1, the estimated .022 cutoff 1990 grade was .0427 oz/ton and the official crushed grade for the year was .042 oz/ton. The actual mined grade without dilution based on the average of nearly 5,000 blast holes was .0491 oz/ton. If the real dilution was 10%, the grade sent to the crusher would have been .0446 oz/ton, which is 6% higher than the official crusher grade. Some of the difference may be due to some low bias in the crusher samples and possibly some high bias in the fire blasthole assays. Note that only about 10% of the blast hole assays were actually fire and the rest were adjusted based on statistical analysis of the fire/assay relationship. If this is so, the two bias may compensate for each estimate, thus making the predicted grade of .022 model cutoff a good estimator of the future oxide crusher grade.

If the true crusher grade was in reality .003 oz/ton higher, this would not have any effect on future gold production because the previous historical recovery was based on the possibly biased crusher head grade. Thus, a predicted higher head grade would be offset by a revised lower recovery.

/rrl

TABLE 1
BROHM MINING CORP. GILT EDGE MINE
1990 MINING RECONCILIATION

VJM 1/30/90

BENCH	TYPE	SUNDAY AREA KTON	SUNDAY AREA MOZ/T	SUNDAY AREA OZ.	DAKOTA MAID AREA KTON	DAKOTA MAID AREA MOZ/T	DAKOTA MAID AREA OZ.	TOTAL ORE KTON	TOTAL ORE MOZ/T	TOTAL ORE OZ.
5520	ACT. BH	0.0	0.0	0	29.3	38.3	1122	29.3	38.3	1122
	MOD >20	0.0	0.0	0	34.0	24.0	816	34.0	24.0	816
	MOD >22	0.0	0.0	0	27.0	25.0	675	27.0	25.0	575
5500	ACT. BH	19.1	55.7	1064	35.0	48.8	1708	54.1	51.2	2772
	MOD >20	19.0	38.0	722	49.0	26.9	1318	68.0	30.0	2040
	MOD >22	14.0	44.0	516	40.0	27.8	1112	54.0	32.0	1728
5480	ACT. BH	341.2	46.0	15695	42.8	54.7	2341	384.0	47.0	18036
	MOD >20	373.0	42.0	15666	59.0	42.0	2478	432.0	42.0	18144
	MOD >22	333.0	44.0	14652	48.0	44.0	2112	381.0	44.0	16764
5460	ACT. BH	256.9	51.0	13102	61.4	71.0	4359	318.3	54.9	17461
	MOD >20	345.0	40.0	13800	76.0	45.5	3461	421.0	41.0	17261
	MOD >22	299.0	43.0	12857	70.0	48.3	3379	369.0	44.0	16236
5440	ACT. BH	257.6	44.9	11566	24.5	35.4	867	282.1	44.1	12434
	MOD >20	284.0	40.0	11360	24.0	27.2	652	308.0	39.0	12012
	MOD >22	255.0	42.0	10710	24.0	30.4	729	279.0	41.0	11439
5420	ACT. BH	202.6	50.8	10292	0.0	0.0	0	202.6	50.8	10292
	MOD >20	173.0	45.0	7785	0.0	0.0	0	173.0	45.0	7785
	MOD >22	161.0	46.0	7406	0.0	0.0	0	161.0	46.0	7406
TOTAL	ACT. BH	1077.4	48.0	51719	193.0	53.9	10398	1270.4	48.9	62117
	MOD >20	1194.0	41.3	49333	242.0	36.1	8725	1436.0	40.4	58058
	MOD >22	1062.0	43.5	46241	209.0	38.3	8007	1271.0	42.7	54248
OFFICAL MINED	TOTAL	1077.4	(1) 45.6	49164	193.1	(1) 51.4	9922	1270.5	(1) 46.5	59086
OFFICAL CRUSHED	TOTAL							(2) 1321.4	42.0	55500

(1) FRINGE DILUTION WAS ADDED IN THE OFFICAL MINED GRADE ESTIMATE
(2) TONNAGE DIFFERENCE DUE TO CHANGES IN ROM STOCKPILE (20,000 T), STANDARD ESTIMATION VARIANCE, AND POSSIBLY MINOR DENSITY CHANGES

FEB 08 '91 11:17 BROHM MINING CO

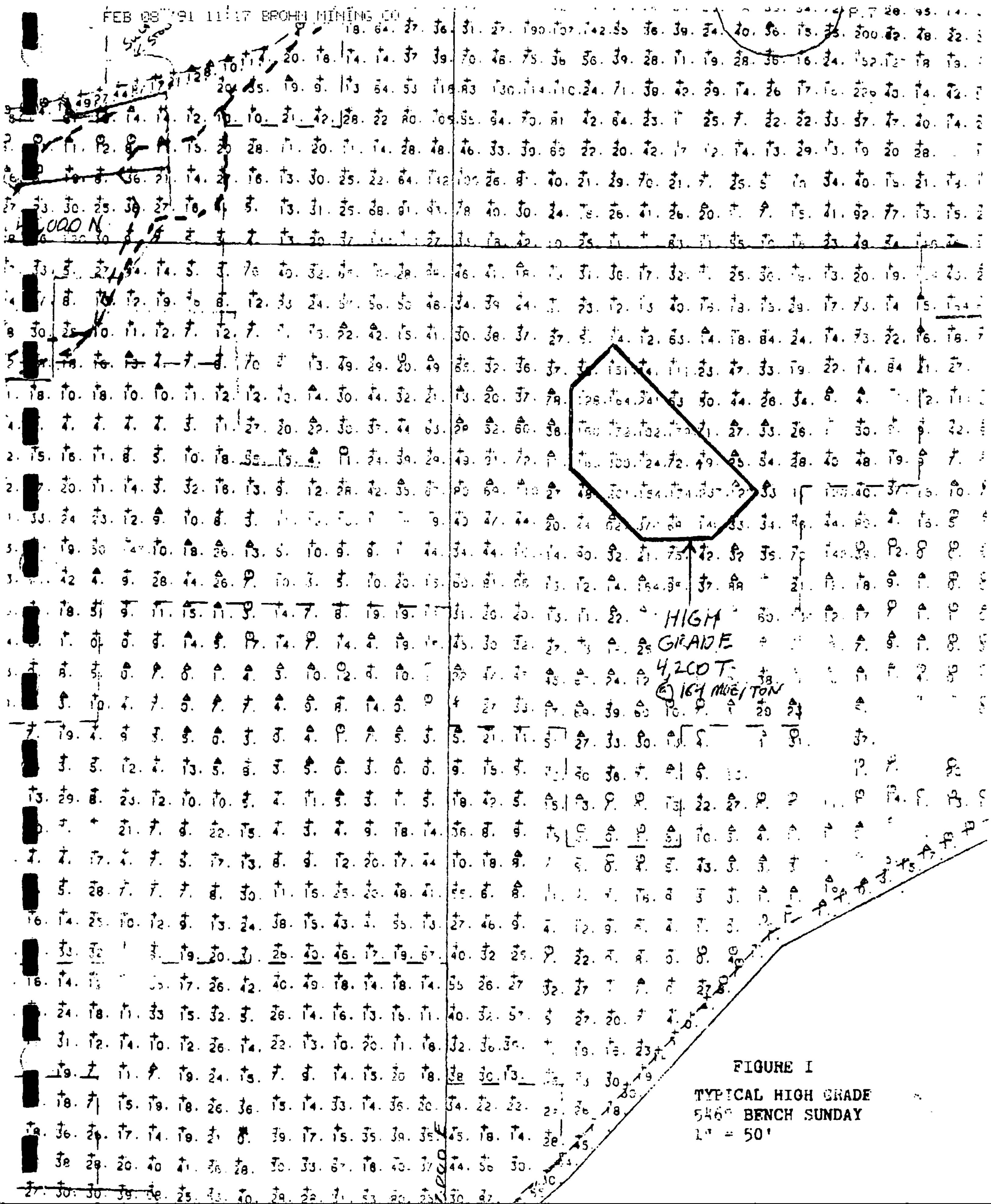

FIGURE I
TYPICAL HIGH GRADE
5460 BENCH SUNDAY
1" = 50'